STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@po.state.ct.us
www.ct.gov/csc

February 28, 2006

New Cingular Wireless PCS, LLC
c/o David Malko
36 Quarry Road
Chester, VT 05143

RE: **EM-CING-057-158-161-060214** - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 323 Riversville Road, Greenwich; 128 Mather Street, Wilton; and 880 Boston Post Road, Westport, Connecticut.

Dear Mr. Malko:

At a public meeting held on February 22, 2006, the Connecticut Siting Council (Council) acknowledged your notice to modify these existing telecommunications facilities, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the condition that Wilton tower is modified per Appendix C of the structural analysis report dated December 9, 2005 and prepared by Kylie Meehan prior to the antenna installation and that a letter signed by a professional engineer is submitted to the Council to certify that the modifications have been properly completed.

The proposed modifications are to be implemented as specified here and in your notice dated February 14, 2006, including the placement of all necessary equipment and shelters within the tower compounds. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to existing facility sites that would not increase tower heights, extend the boundaries of the tower sites, increase noise levels at the tower site boundaries by six decibels, and increase the total radio frequencies electromagnetic radiation power densities measured at the tower site boundaries to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. These facilities have also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on these towers.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to any of these facilities will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Pamela B. Katz, P.E.
Chairman

PBK/laf

c: The Honorable James A. Lash, First Selectman, Town of Greenwich
Diane Fox, Planning & Zoning Director, Town of Greenwich
The Honorable Gordon F. Joseloff, First Selectman, Town of Westport
Katherine Barnard, Director of Planning and Zoning, Town of Westport
The Honorable William Francis Brennan, First Selectman, Town of Wilton
Robert Nerney, Town Planner, Town of Wilton
Brian Benito, Bureau of Police Support – Telecommunications
Christopher B. Fisher, Esq., Cuddy & Feder LLP
Michele G. Briggs, New Cingular Wireless PCS, LLC
Jeffrey W. Barbadora, Crown Atlantic Company, LLC
Christine Farrell, T-Mobile
Kenneth C. Baldwin, Esq., Robinson & Cole LLP
Thomas F. Flynn III, Sprint/Nextel Communications, Inc.
Thomas J. Regan, Esq., Brown Rudnick Berlack Israels, LLP

cingular
raising the bar

February 22, 2006

Mr. S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-CING-057-158-161-060214 - Notice of Exempt Modifications to Various Facilities in the Towns of Greenwich, Wilton, and Westport, Connecticut**

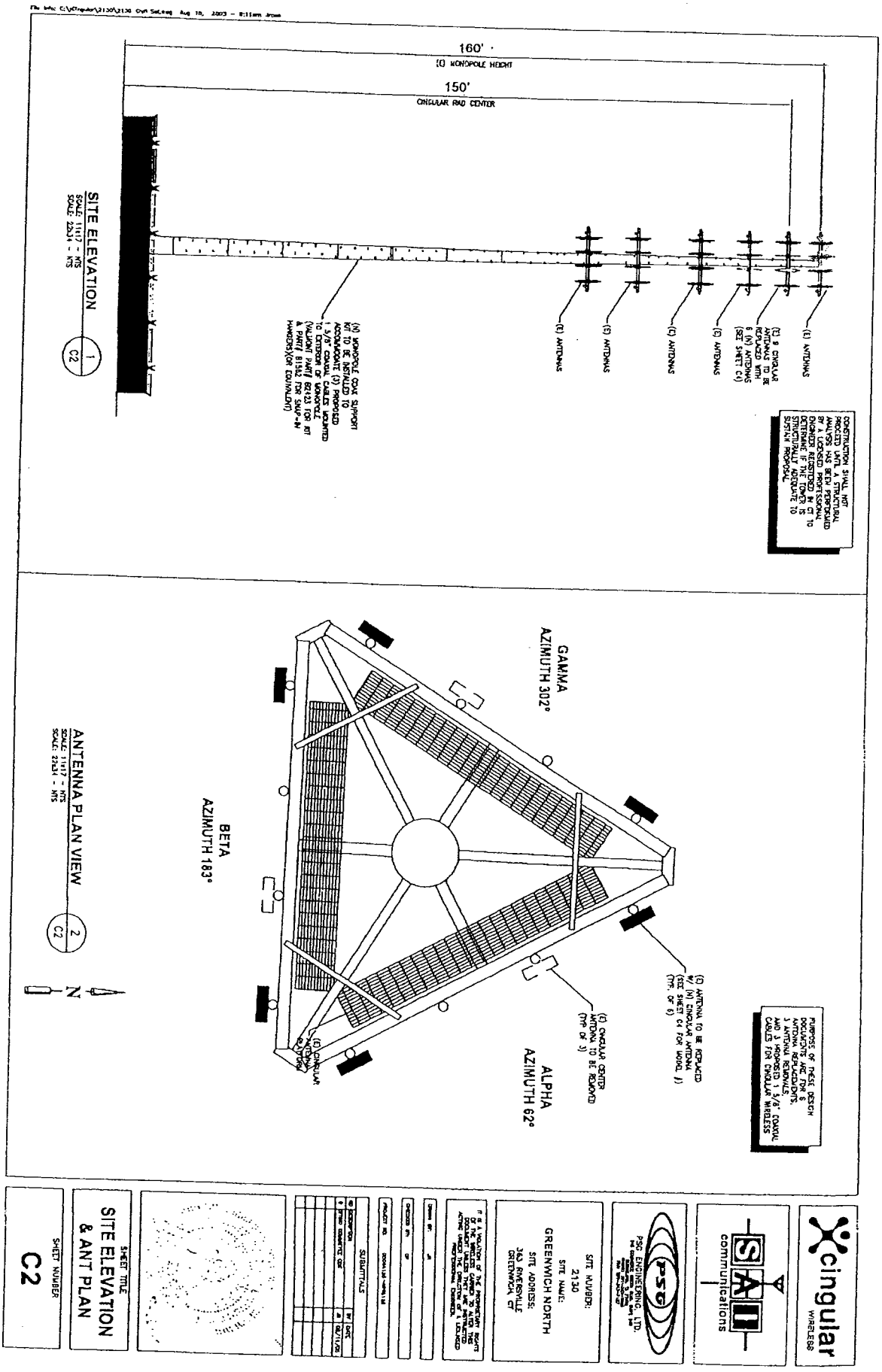
Dear Mr. Phelps:

Attached is a revised tower elevation for the Riversville Road, Greenwich site that is the subject of the above referenced notice of exempt modification. The revised drawing corrects the overall height of the tower (160' AGL) and the radiation center of the Cingular antennas (150' AGL). With these changes, the drawing is consistent with the tower structural analysis and the application narrative. I apologize for any confusion resulting from the earlier drawing.

Sincerely,

David S. Malko, P.E.
Consultant for New Cingular Wireless

Attachment


160'
(E) MONOPOLE HEIGHT
150'
CINGULAR RAD CENTER
(E) ANTENNAS
(E) ANTENNAS
(E) ANTENNAS
(E) ANTENNAS
(E) ANTENNAS
(E) 9 CINGULAR ANTENNAS TO BE REPLACED WITH 6 (N) ANTENNAS (SEE SHEET C1)
(N) MONOPOLE COAX SUPPORT KIT TO BE INSTALLED TO ACCOMMODATE (3) PROPOSED 1 5/8" COAXIAL CABLES MOUNTED TO EXTERIOR OF MONOPOLE (VALMONT PART# 82123 FOR KIT & PART# 81582 FOR SNAP-IN HANGERS)(OR EQUIVALENT)
CONSTRUCTION SHALL NOT PROCEED UNTIL A STRUCTURAL ANALYSIS HAS BEEN PERFORMED BY A LICENSED STRUCTURAL ENGINEER REGISTERED IN VT TO DETERMINE IF THE TOWER IS STRUCTURALLY ADEQUATE TO SUSTAIN PROPOSAL
SITE ELEVATION
SCALE: 11x17 - NTS
SCALE: 22x34 - NTS
1
C2
GAMMA
AZIMUTH 302°
BETA
AZIMUTH 183°
ALPHA
AZIMUTH 62°
(E) ANTENNA TO BE REMOVED W/ (N) SINGULAR ANTENNA (SEE SHEET C4 FOR MODEL #) (TYP. OF 6)
(E) CINGULAR ANTENNA TO BE REMOVED (TYP OF 3)
(E) CINGULAR EQUIPMENT PLATFORM
PURPOSES OF THESE DESIGN DOCUMENTS ARE FOR 6 ANTENNA REPLACEMENTS, 3 ANTENNA REMOVALS, AND THE INSTALLATION OF 3 PROPOSED 1 5/8" COAXIAL CABLES FOR CINGULAR WIRELESS
ANTENNA PLAN VIEW
SCALE: 11x17 - NTS
SCALE: 22x34 - NTS
2
C2
N
N
cingular WIRELESS
SAI communications
PSC ENGINEERING, LTD.
SITE NUMBER:
2130
SITE NAME:
GREENWICH NORTH
SITE ADDRESS:
363 RIVERSVILLE
GREENWICH, CT
SUBMITTALS
DESCRIPTION
FINAL SUBMITTAL SET
SHEET TITLE
SITE ELEVATION & ANT PLAN
SHEET NUMBER
C2

STATE OF CONNECTICUT

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February 17, 2006

The Honorable William Francis Brennan
First Selectman
Town of Wilton
Town Hall
238 Danbury Road
Wilton, CT 06897

RE: **EM-CING-057-158-161-060214** - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 323 Riversville Road, Greenwich; 128 Mather Street, Wilton; and 880 Boston Post Road, Westport, Connecticut.

Dear Mr. Brennan:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting scheduled for February 22, 2006 at 1:30 p.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

If you have any questions or comments regarding this proposal, please call me or inform the council by February 21, 2006.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/ap

Enclosure: Notice of Intent

c: Robert Nerney, Town Planner, Town of Wilton

G:\EM\CINGULAR\Wilton\Brennan.DOC

CSC
CONNECTICUT SITING COUNCIL

STATE OF CONNECTICUT

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February 17, 2006

The Honorable James A. Lash
First Selectman
Town of Greenwich
Town Hall
101 Field Point Road
P. O. Box 2540
Greenwich, CT 06836-2540

RE: **EM-CING-057-158-161-060214** - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 323 Riversville Road, Greenwich; 128 Mather Street, Wilton; and 880 Boston Post Road, Westport, Connecticut.

Dear Mr. Lash:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting scheduled for February 22, 2006 at 1:30 p.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

If you have any questions or comments regarding this proposal, please call me or inform the council by February 21, 2006.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/ap

Enclosure: Notice of Intent

c: Diane Fox, Planning & Zoning Director, Town of Greenwich

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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February 17, 2006

The Honorable Gordon F. Joseloff
First Selectman
Town of Westport
Town Hall
110 Myrtle Avenue
Westport, CT 06880

RE: **EM-CING-057-158-161-060214** - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 323 Riversville Road, Greenwich; 128 Mather Street, Wilton; and 880 Boston Post Road, Westport, Connecticut.

Dear Mr. Joseloff:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting scheduled for February 22, 2006 at 1:30 p.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

If you have any questions or comments regarding this proposal, please call me or inform the council by February 21, 2006.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/ap

Enclosure: Notice of Intent

c: Katherine Barnard, Director, Planning & Zoning, Town of Westport

EM-CING-057-158-161-060214

cingular
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February 14, 2006

ORIGINAL

Mr. S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modifications to Various Facilities in the Towns of Greenwich, Wilton, and Westport, Connecticut**

Dear Mr. Phelps:

As part of its merger and integration efforts, New Cingular Wireless PCS, LLC ("Cingular" or "the Company") intends to modify instrumentation and/or antenna configurations at three existing facilities located in the Towns of Greenwich, Wilton and Westport, Connecticut. Please accept this letter and attachments as notification, pursuant to R.C.S.A. § 16-50j-73, of construction that constitutes exempt modifications pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of each of the municipalities in which an affected cell is located.

The three sites which are the subject of this filing have been grouped based on their location and proximity and are discussed in more detail below. Additional exempt modification notifications will follow in the near future and will cover similarly grouped facilities within the balance of Fairfield County.

General

The current project involves changes at most of Cingular's cell sites in Fairfield County including over 40 sites under Council jurisdiction. The modifications will allow Cingular to operate its wireless communications services in the 1900 MHz frequency band in addition to its 850 MHz operations. At a typical site, this will be accomplished through the removal of nine (9) existing 850 MHz only antennas and their replacement with six (6) 850/1900 MHz dual-band antennas. Since each of the new, dual-band antennas is fed by two transmission lines, the typical number of such transmission lines at each site will increase from nine to a total of 12. In addition, tower mounted amplifiers, diplexers and small miscellaneous electronics will also be installed on the antenna platforms. The new antennas, transmission lines and tower mounted equipment have been properly reflected in the structural analyses performed for the towers and attached to this filing. A more detailed analysis of each of the three sites follows.

Site 1

Site 1 is located at 323 Riversville Road, Greenwich, CT and is owned by Cingular (Cingular Site #2130). On the property are a 160-foot monopole tower and several equipment shelters and pad mounted equipment cabinets. In addition to Cingular,

the tower currently supports the antennas of wireless carriers AT&T Wireless, T-Mobile, Verizon, Nextel and Sprint.

Cingular proposes to remove their nine (9) existing single-band antennas and install six (6) Powerwave Model 7770.00 dual-band directional antennas. The new antennas are 55" in height and will be mounted on the same platform as the existing antennas with a center of radiation of 150' above ground level (AGL). Six (6) tower mounted amplifiers and six (6) diplexers along with miscellaneous electronics to provide remote downtilting capabilities will also be installed on the existing antenna platform. Technical specification sheets for the antennas, amplifiers and diplexers are included the General Information section of the attachments to this notice. Additional radio equipment will be located within the Company's existing 11' x 25' equipment shelter. Since each new antenna requires two feeds from the radio equipment, new transmission lines will be added to the tower bringing the total number of lines to 12. A structural analysis has been performed for the tower taking into account the new antennas, transmission lines and other equipment and is included in the site specific section of the attachments. Site plans, elevations and photographs of the site are also included.

Based on the most recent filing for this site, the "worst-case" predicted RF power density for a point at the base of the tower, *excluding the operations of Cingular and AT&T Wireless*, is calculated to be approximately 16.12% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site. A similar "worst-case" calculation for a point at the base of the tower indicates that when fully implemented, New Cingular's dual-band operations would contribute approximately 4.56% of the standard. The calculated "worst-case" power density for the combined operations at the site would therefore be approximately 20.68% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

Site 2

Site 2 is located at 128 Mather Street, Wilton, CT and is owned by Crown Castle (Cingular Site #2142). On the property are a 180-foot lattice tower and several equipment shelters and pad mounted equipment cabinets. In addition to Cingular, the tower currently supports the antennas of wireless carriers AT&T Wireless, T-Mobile, Verizon, Nextel and Sprint as well as the Town of Wilton.

Cingular proposes to remove their nine (9) existing single-band antennas and install six (6) Powerwave Model 7770.00 dual-band directional antennas. The new antennas are 55" in height and will be mounted on the same platform as the existing antennas with a center of radiation of 150' AGL. Six (6) tower mounted amplifiers and six (6) diplexers along with miscellaneous electronics to provide remote downtilting capabilities will also be installed on the existing antenna platform. Technical specification sheets for the antennas, amplifiers and diplexers are included the General Information section of the attachments to this notice. Additional radio equipment will be located within the Company's existing equipment room. Since each new antenna requires two feeds from the radio equipment, new transmission lines will be added to the tower bringing the total number of lines to 12. A structural analysis has been performed for the

tower taking into account the new antennas, transmission lines and other equipment and is included in the site specific section of the attachments. Site plans, elevations and photographs of the site are also included.

Based on the most recent filing for this site, the "worst-case" predicted RF power density for a point at the base of the building, *excluding the operations of Cingular and AT&T Wireless*, is calculated to be approximately 19.09% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site. A similar "worst-case" calculation for a point at the base of the building indicates that when fully implemented, New Cingular's dual-band operations would contribute approximately 4.51% of the standard. The calculated "worst-case" power density for the combined operations at the site would therefore be approximately 23.60% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

Site 3

Site 3 is located at 880 Boston Post Road, Westport, CT and is owned by the Connecticut State Police (Cingular Site #2147). On the property are a 180-foot lattice tower and several equipment shelters and pad mounted equipment cabinets. In addition to Cingular, the tower currently supports the antennas of wireless carriers AT&T Wireless, T-Mobile, and Verizon as well as the State Police.

Cingular proposes to remove their three (3) existing single-band antennas and install two (2) Powerwave Model 7770.00 dual-band directional antennas. The new antennas are 55" in height and will be mounted on the same platform as the existing antennas with a center of radiation of 133' above ground level (AGL). Two (2) tower mounted amplifiers and two (2) diplexers along with miscellaneous electronics to provide remote downtilting capabilities will also be installed on the existing antenna platform. Technical specification sheets for the antennas, amplifiers and diplexers are included the General Information section of the attachments to this notice. Additional radio equipment will be located within the Company's existing 8' x 18' equipment shelter at the base of the tower. Since each new antenna requires two feeds from the radio equipment, new transmission lines will be added to the tower bringing the total number of lines to four. A structural analysis has been performed for the tower taking into account the new antennas, transmission lines and other equipment and is included in the site specific section of the attachments. Site plans, elevations and photographs of the site are also included.

Based on the most recent filing for this site, the "worst-case" predicted RF power density for a point at the base of the tower, *excluding the operations of Cingular and AT&T Wireless*, is calculated to be approximately 23.08% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site. A similar "worst-case" calculation for a point at the base of the tower indicates that when fully implemented, New Cingular's dual-band operations would contribute approximately 4.08% of the standard. The calculated "worst-case" power density for the combined operations at the site would therefore be approximately 27.16% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

Summary

The proposed changes to the facilities do not constitute modifications as defined in Connecticut General Statutes ('C.G.S.") § 16-50i(d) because the general physical characteristics of the facilities will not be significantly changed or altered. Rather, the planned modifications to the facilities fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the heights of the towers. In all cases, the number of antennas will be reduced and will result in a reduction in the structures' profiles. The enclosed tower drawings confirm that the planned modifications will not increase the heights or the profiles of the structures. Based on the attached structural analyses, the towers are capable of supporting the reconfigured loads discussed herein.

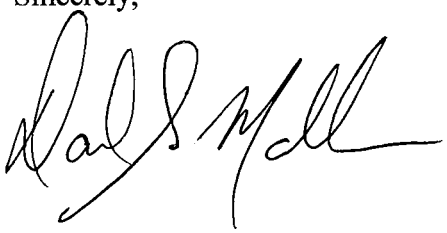
2. The installation of the proposed equipment, as reflected on the attached site plans, will not require an extension of the site boundaries.

3. The proposed modifications to the facility will not increase the noise levels at the existing facility by six decibels or more.

4. As discussed above, the operation of the reconfigured sites will not increase the total radio frequency (RF) power density to a level at or above the applicable standard.

For the foregoing reasons, New Cingular Wireless PCS, LLC respectfully submits that the proposed addition of antennas and equipment at the subject facilities constitute exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



David S. Malko, P.E.
Consultant for New Cingular Wireless

Enclosures

cc: Honorable Jim Lash, First Selectman, Greenwich
Honorable William F. Brennan, First Selectman, Wilton
Honorable Gordon F. Joseloff, First Selectman, Westport

General Information Attachments

1. Antenna Specifications
2. Tower Mounted Amplifier Specifications
3. Diplexer Specifications

Dual Broadband Antenna

90° 1.4 m MET Antenna

Part Number: 7770.00	Horizontal Beamwidth: 90° Gain: 13.5/16 dBi	Electrical Downtilt: Adjustable Connector Type: 7/16 female

The Powerwave dual band dual polarized broadband antenna has individual adjustable electrical downtilt per band (upgradeable to Remote Electrical Tilt (RET). Four connector ports allow separate tilts on each frequency band and ensure the use of diversity concepts. The phase shifter technology, based on a patented sliding dielectric, minimizes intermodulation distortion and maximizes efficiency. The slant +/- 45° dual polarization system provides the independent fading signals needed for achieving top-quality coverage via diversity concepts. The Powerwave Broadband antenna design is based on a patented stacked aperture-coupled patch technology, which provides high isolation performance and a wide VSWR bandwidth. The antennas have superior radiation patterns due to a unique reflector design which provides a very small variation of the –3dB horizontal beam width over the frequency band as well as a high front-to-back ratio.

Key Benefits

- Excellent broad- and multi-band capabilities
- Polarization purity makes good diversity gain
- Excellent pattern performance and high gain over frequency
- High passive intermodulation performance
- Light, slim and robust design

Preliminary

Dual Broadband Antenna

806-960/1710-2170 MHz

Electrical Specifications (Preliminary)

Frequency band (MHz)	806-960		1710-2170
Gain, ± 0.5dB (dBi)	13.5		16.0
Polarization		Dual linear ±45°	
Nominal Impedance (Ohm)		50	
VSWR	1.5:1		
VSWR			1.5:1
Isolation between inputs (dB)	30		
Isolation between inputs (dB)			30
Inter band isolation (dB)		40	
Horizontal -3 dB beamwidth	85 ± 5°		85 ± 5°
Tracking, Horizontal plane, ±60° (dB)	<2.0		
Tracking, Horizontal plane, ±60° (dB)			<2.0
Electrical downtilt range (adjustable)	0° to 10°		0° to 8°
Vertical -3 dB beamwidth	14.3 ± 2.0°		6.6 ± 1°
Sidelobe suppression, Vertical 1 st upper (dB)	>17,16,15 x=0, 5, 10° MET		> 17, 16,15 x=0, 4, 8° MET
Vertical beam squint	<0.8°		<0.5°
First null-fill (dB)	<-25		<-25
Front-to-back ratio (dB)	>25		>27
Front-to-back ratio, total power (dB)	>20		>23
IM3, 2Tx@43dBm (dBc)	<-153		
IM3, 2Tx@43dBm (dBc)			<-153
IM7, 2Tx@43dBm (dBc)			<-160
Power Handling, Average per input (W)	400		250
Power Handling, Average total (W)	800		500

All specifications are subject to change without notice.
Contact your Powerwave representative for complete performance data.

Mechanical Specifications

Connector Type	4 x 7/16 DIN female
Connector Position	Bottom
Dimensions, HxWxD	1408mm x 280mm x 125mm (55"x11"x5")
Weight Including Brackets	15.8 kg (35 lbs)
Wind Load, Frontal, 42m/s Cd=1	435N (98 lbf)
Survival Wind Speed (m/s)	70 (156mph)
Lightning Protection	DC grounded
Radome Material	GRP
Radome Color	Light Gray
Mounting	Pre-mounted Standard Brackets
Packing Size	1550mm x 355mm x 255mm (61"x14"x10")

Corporate Headquarters
Powerwave Technologies, Inc.
1801 East St. Andrew Place
Santa Ana, CA 92705 USA
Tel: 714-466-1000
Fax: 714-466-5800
www.powerwave.com

Main European Office
Antennvägen 6
SE-187 80 Täby
Sweden
Tel: +46 8 540 822 00
Fax: +46 8 540 823 40

Main Asia Pacific Office
23 F Tai Yau Building
181 Johnston Road
Wanchai, Hong Kong
Tel: +852 2512 6123
Fax: +852 2575 4860

Powerwave technologies

COVERAGE AND CAPACITY | TECHNOLOGY LEADERSHIP | GLOBAL PARTNER | INTEGRATED SOLUTIONS | QUALITY AND RELIABILITY

D031-08208 Rev A

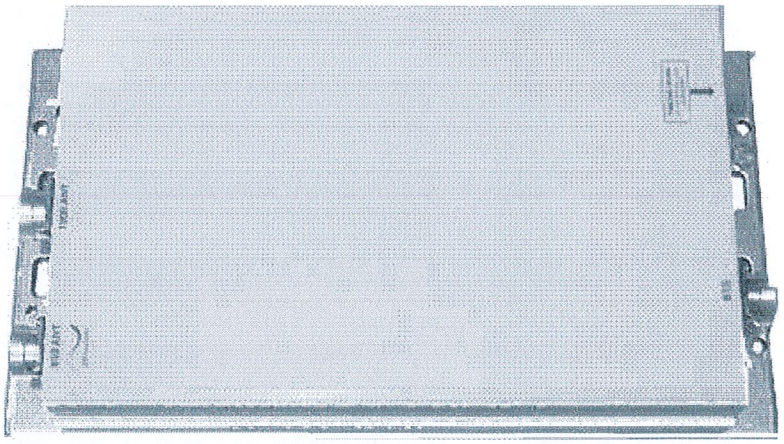
Tower Mounted Amplifier

LGP21401 TMA-DD-1900 FB with 850 Bypass Tower Mounted Amplifier

800/1900 MHz

Frequency: 1850-1990 MHz Band	IMD Specification: <-118dBm
Gain: 12 dBd	Return Loss:18 dB or better

Powerwave's 21401 Series of tower mounted amplifiers are designed for full band coverage of the PCS-1900 band with an 800 MHz cellular band bypass. It has dual duplex capability so you can use one line for RX/TX and transmit through the TMA while amplifying RX on the same line. Deployed in a network it will increase capacity and coverage as well as extend the battery life time for the handsets. The 800 MHz cellular band passes through the TMA without amplification.



ANTENNA SYSTEMS

BASE STATION SYSTEMS

COVERAGE SYSTEMS

THE POWER IN WIRELESS®

Powerwave technologies

LGP21401 - Tower Mount Amplifier

800/1900 MHz

Gain	12 dB
Uplink frequency	1850-1910 MHz
Downlink frequency	1930 – 1990 MHz
Return loss	18 dB or better
Noise figure	1.5 dB typical
Intermodulation@2x43dBm carriers	<-118 dBm in receive band
Output 3rd order Intercept Point (OIP3)	>+22 dBm
Rejection 1912 MHz (RX in Filter)	10 dB
Rejection in TX band	80 dB
Alarm functionality	Two levels, individually supervised LNA branches
Power consumption	1.5 W per LNA @12 VDC
Supply voltage	9 - 15 V

Mechanical Specifications

RF connectors	7/16 DIN female(s)
Dimensions	14"x7"x2.7" (365x176x68mm)
Weight	17.5 lbs (<8kg)
Mounting kit	Mounting kit is included for pole and wall. Other types may be available on request.

Corporate Headquarters
Powerwave Technologies, Inc.
1801 East St. Andrew Place
Santa Ana, CA 92705 USA
Tel: 714-466-1000
Fax: 714-466-5800
www.powerwave.com

Main European Office
Antennvägen 6
SE-187 80 Täby
Sweden
+46 8 540 822 00
+46 8 540 824 85 FAX

THE POWER IN WIRELESS®

Powerwave technologies

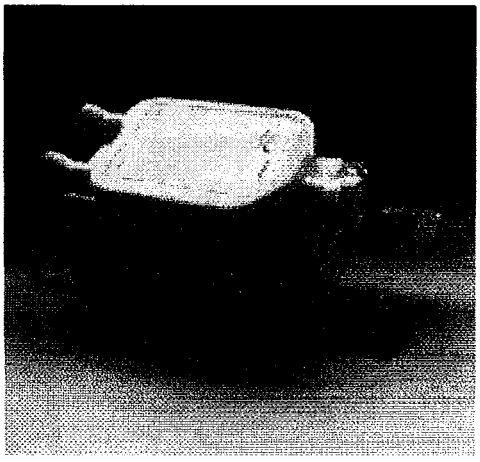
PN0000000-00

824-896/1850-1990 MHz Diplexer

Diplexer for 824-896/1850-1990MHz with Configurable DC Transparency

Part Number:	Frequency Range: 824-894/1850-1990 MHz	Return Loss: >20 dB
LGP13519		Insertion Loss: 0.2 dB / 0.3 dB

The Powerwave® Diplexer filter DCT is available both as single and double unit. Each diplexer has one port for 824-894 systems, one port for 1850-1990 GSM systems and a common port. It is designed for outdoor use and intended for co-location of base stations to enable sharing of feeder, TMA system and antenna. The unit can be used both at the BTS and for combining frequency bands to a common port and at the antenna end for splitting the frequency bands to separate antennas.



824-894/1850-1990 MHz Diplexer

Key Benefits:

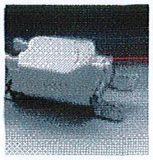
- Compact Design
- Inbuilt DC Transparency and Subcarrier Support
- Excellent Power Handling
- Negligible Transmit Band Loss
- Lightning Protected on All Ports

ANTENNA SYSTEMS

BASE STATION SYSTEMS

COVERAGE SYSTEMS

824-894/1850-1990 Diplexer



824-894/1850-1990

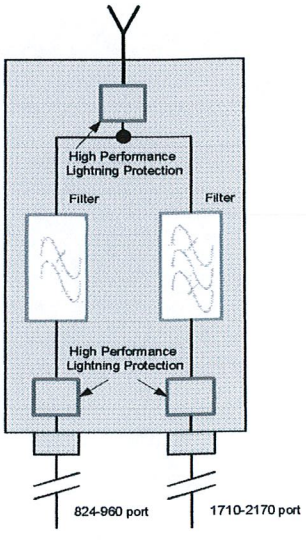
Electrical Specifications

800-900 Port	Frequency Range, Full Band (MHz)	824-894 MHz
	Insertion Loss (dB)	<0.2 dB
	Return Loss (dB)	>20 dB
	Rejection 1850-1990 MHz	>55 dB
	Rejection 2110-2170 MHz	>55 dB
	Average Power Handling	>500 W
	Peak Power	10 kW
	IM, 2Tx@43dBm (dBc)	<-153
1900 Port	Frequency Range, Full Band (MHz)	1850-1990 MHz
	Insertion Loss (dB)	<0.3 dB
	Return Loss (dB)	>20 dB
	Rejection 824-896 MHz	>54 dB
	Rejection 896-960 MHz	>54 dB
	Average Power Handling	>250 W
	Peak Power	5 kW
	IM, 2Tx@43dBm (dBc)	<-153

All specifications are subject to change without notice. Contact your Powerwave representative for complete performance data.

Mechanical Specifications

Size, WxHxD (without mounting plate)	4.4" x 6.3" x 3" (112x158x74mm)
Weight	2.4 kg (5.3 lbs)
Color	Off White (NCS 1502-R)
Housing	Aluminum, IP 65
RF-connectors	DIN 7/16 female
Mounting Kit	Hose Clamps in Stainless Steel
Temperature Range	-40 °C to +65 °C
MTBF	30 Million Hours
Safety	EN 60 950, UL 69 950, ETL
Ingress Protection IP 65	EN 60 529
Environmental	ETS 300 019



Corporate Headquarters
Powerwave Technologies, Inc.
1801 East St. Andrew Place
Santa Ana, CA 92705 USA
Tel: 714-466-1000
Fax: 714-466-5800
www.powerwave.com

Main European Office
Antennvägen 6
SE-187 80 Täby
Sweden
Tel: +46 8 540 822 00
Fax: +46 8 540 823 40

Hong Kong Office
23 F Tai Yau Building
181 Johnston Road
Wanchai, Hong Kong
Tel: +852 2512 6123
Fax: +852 2575 4860

Powerwave technologies

COVERAGE AND CAPACITY | TECHNOLOGY LEADERSHIP | GLOBAL PARTNER | INTEGRATED SOLUTIONS | QUALITY AND RELIABILITY

PNLGP135nn

Site Specific Attachments

Site 1

1. Site Plans
2. Tower Structural Analysis
3. Site Photographs

APPROVALS

NAME (PRINT)	SIGNATURE	DATE
CINGULAR		
NAME (PRINT)	SIGNATURE	DATE
SAI		
NAME (PRINT)	SIGNATURE	DATE
SITING COUNCIL COMMITTEE		
NAME (PRINT)	SIGNATURE	DATE
OTHER		

SITE NUMBER: 2130
SITE NAME: GREENWICH NORTH

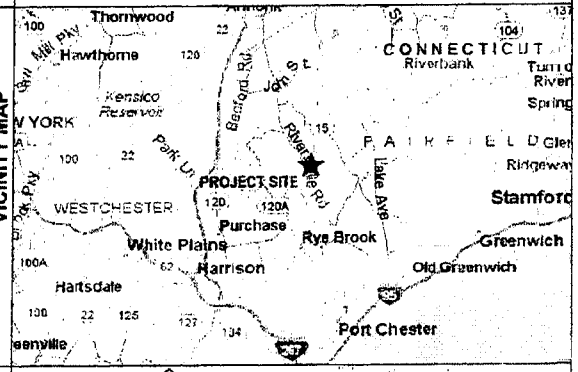
DRAWING INDEX

		REV
2130 - T1	TITLE SHEET	0
2130 - C1	SITE PLAN	0
2130 - C2	SITE ELEVATION & ANTENNA PLAN	0
2130 - C3	ANTENNA PLUMBING DIAGRAM-ALPHA-BETA-GAMMA	0
2130 - C4	RF DATA INFORMATION	0

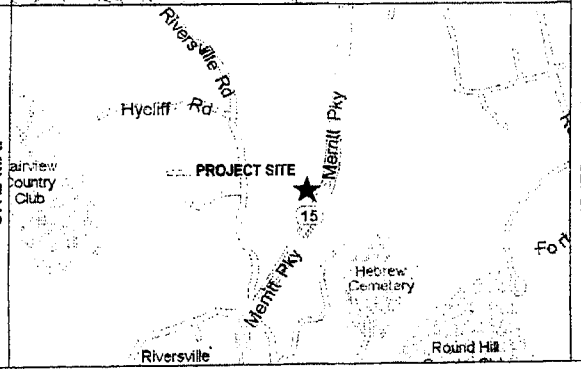
MAPS & DIRECTIONS

FROM I-95 EAST TAKE EXIT 21 AND BEAR RIGHT ONTO US-1 (BOSTON POST RD). CONTINUE ON S PEARL ST AND BEAR RIGHT ONTO SR-120A (N PEARL ST). TURN RIGHT ONTO GLENVILLE ST. TURN LEFT ONTO RIVERSVILLE RD AND BEAR RIGHT ONTO THUNDER MOUNTAIN RD. TOWER SITE IS ON THE LEFT.

VICINITY MAP



SITE MAP



BLDG. CODES AND STANDARDS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
INTERNATIONAL BUILDING CODE (IBC), 2003

ELECTRICAL CODE:
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70 - 2002 NATIONAL ELECTRICAL CODE

LIGHTNING PROTECTION CODE:
NFPA 780 - 2000, LIGHTNING PROTECTION CODE

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS.
AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES;
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1275, GENERAL INSTALLATION REQUIREMENTS

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE NUMBER:	2130
SITE NAME:	GREENWICH NORTH
ADDRESS:	363 RIVERSVILLE RD
CITY, STATE ZIP	GREENWICH, CT
LATITUDE:	41.056456°
LONGITUDE:	-73.671853°
JURISDICTION:	FAIRFIELD COUNTY
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
SITE TYPE:	MONOPOLE
RAD CENTER:	138'-0"
OWNER:	CINGULAR

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.

SITE NUMBER:
2130
SITE NAME:
GREENWICH NORTH
SITE ADDRESS:
363 RIVERSVILLE
GREENWICH, CT

DRAWN BY: JR
CHECKED BY: DP
PROJECT NO: 0504A150-A050150

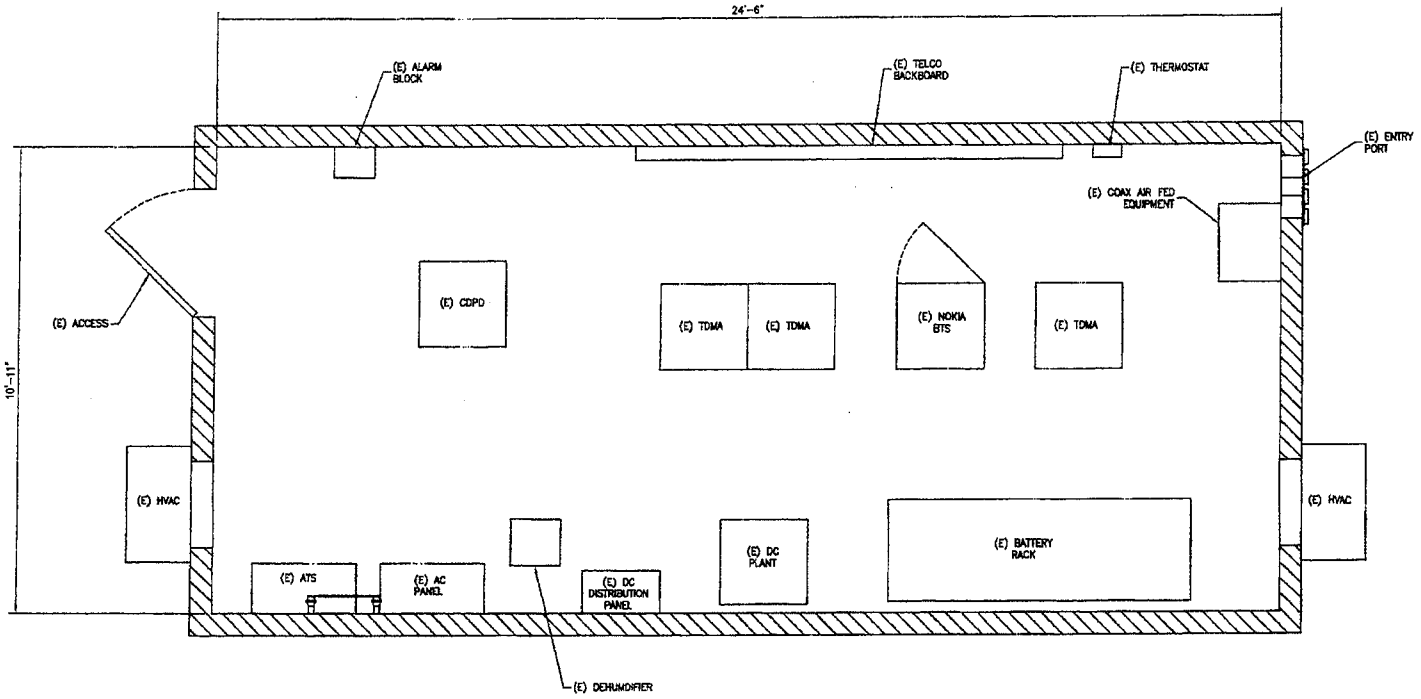
SUBMITTALS

NO	DESCRIPTION	BY	DATE
0	SITING COMMITTEE CDS	JR	05/19/05

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T1

PURPOSE OF THESE DESIGN DOCUMENTS ARE FOR 6 ANTENNA REPLACEMENTS, 3 ANTENNA REMOVALS, AND 3 PROPOSED 1 5/8" COAXIAL CABLES FOR CINGULAR WIRELESS



SITE PLAN

1 / C1

SCALE: 11x17 - 3/8"=1'-0"
SCALE: 22x34 - 3/4"=1'-0"

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.

SITE NUMBER:
2130
SITE NAME:
GREENWICH NORTH
SITE ADDRESS:
363 RIVERSVILLE
GREENWICH, CT

DRAWN BY: JB
CHECKED BY: DP
PROJECT NO: 050A186-A86106

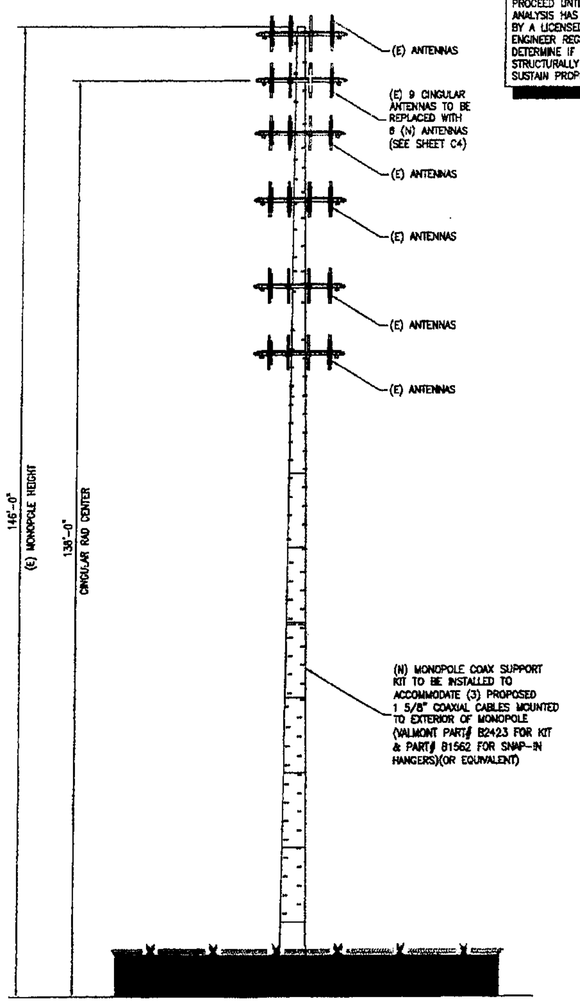
SUBMITTALS

NO	DESCRIPTION	BY	DATE
0	ISSUED CONSTRUCTION DOCS	JB	08/16/05

SHEET TITLE
SITE PLAN

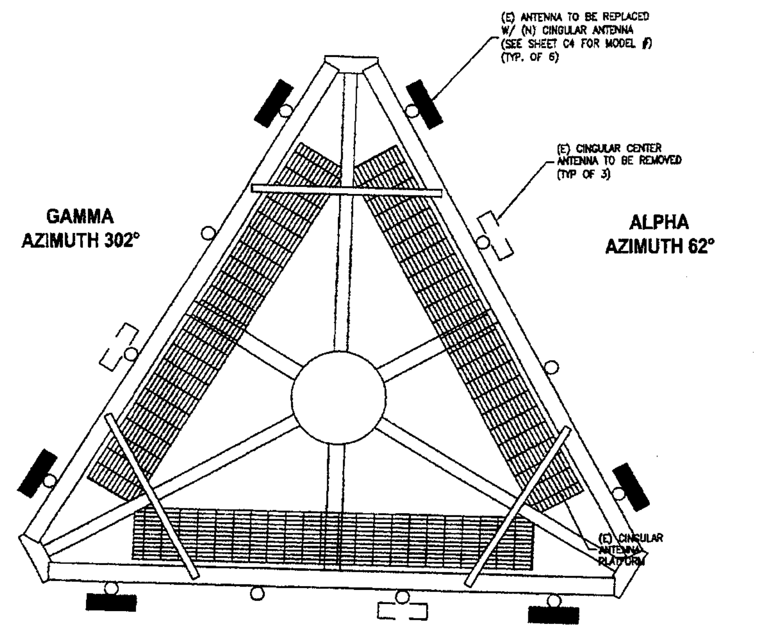
SHEET NUMBER
C1

CONSTRUCTION SHALL NOT PROCEED UNTIL A STRUCTURAL ANALYSIS HAS BEEN PERFORMED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN CT TO DETERMINE IF THE TOWER IS STRUCTURALLY ADEQUATE TO SUSTAIN PROPOSAL.



SITE ELEVATION (1 / C2)
SCALE: 11x17 - NTS
SCALE: 22x34 - NTS

PURPOSE OF THESE DESIGN DOCUMENTS ARE FOR 6 ANTENNA REPLACEMENTS, 3 ANTENNA REMOVALS, AND 3 PROPOSED 1 5/8" COAXIAL CABLES FOR CINGULAR WIRELESS



ANTENNA PLAN VIEW (2 / C2)
SCALE: 11x17 - NTS
SCALE: 22x34 - NTS

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.

SITE NUMBER:
2130
SITE NAME:
GREENWICH NORTH
SITE ADDRESS:
363 RIVERSVILLE
GREENWICH, CT

IT IS A VIOLATION OF THE PROPRIETARY RIGHTS OF THE WIRELESS CARRIER TO ALTER THIS DOCUMENT UNLESS THEY ARE INSTRUCTED ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER.

DRAWN BY: JR
CHECKED BY: DP
PROJECT NO: D504A133-A660150

SUBMITTALS

NO	DESCRIPTION	BY	DATE
0	SITING COMMITTEE DDS	JR	08/18/05

SHEET TITLE
SITE ELEVATION & ANT PLAN

SHEET NUMBER
C2

File info: C:\Cingular\2130\2130 CNA Set.dwg Aug 18, 2005 - 9:11am dross

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF 160' MONOPOLE FOR NEW ANTENNA ARRANGEMENT

Cingular Site #2130
363 Riversville Road
Greenwich, Connecticut

prepared for

Site Acquisitions, Inc.
184 Rockingam Road, Unit A
Londonderry, NH 03053

cingular WIRELESS

Cingular Wireless
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

prepared by

URS

URS CORPORATION
500 ENTERPRISE DR, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36915469.00008
SAI-009

February 3, 2006

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 160' steel monopole structure located at 363 Riversville Road in Greenwich, Connecticut. The analysis was conducted in accordance with the TIA/EIA-222-F standard for wind velocity of 85 mph and 74 mph concurrent with ½" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed Cingular Wireless modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove (9) existing antennas **Install (6) Powerwave 7770.00 antennas, (6) LGP13519 diplexers, and (6) LGP21401 TMA's on the existing Low Profile Platform with (12) 1 5/8" coax cables.**	**Cingular Wireless (Proposed)**	**@ 150'**

The results of the analysis indicate that the tower structure is in compliance with the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the TIA/EIA-222-F wind load classification specified above and all the existing and proposed antenna loading.**

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry and structural member sizes taken from original construction drawings (EEI Job #: 5590) prepared by Engineered Endeavors, Inc., signed and sealed June 27, 2001.
3) Antenna and mount configuration as specified on the following page of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

Richard A. Sambor, P.E.
Manager Facilities Design

RAS/jek

cc: AA, DR, IA – URS
CF/Book

2. INTRODUCTION

The subject tower is located at 363 Riversville Road in Greenwich, Connecticut. The structure is a 160' steel monopole designed by EEI, Inc.

The tower geometry and structure member sizes were taken from the original construction drawings (EEI Job #: 5590) prepared by Engineered Endeavors, Inc., signed and sealed June 27, 2001.

The inventory is summarized in the table below:

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(12) DR65-18-02DPL2Q antennas and (12) TMA's	T-Mobile (existing and future)	Low-Profile Platform	160'	(24) 1 5/8" coax cables (within monopole)
(6) Powerwave 7770.00 antennas, (6) LGP13519 diplexers, and (6) LGP21401 TMA's	**Cingular (proposed)**	Low-Profile Platform	150'	(9) existing 1 5/8" coax cables and **(3) new 1 5/8" coax cables** (within monopole)
(6) DB844H90 antennas and (6) DB948F85T2E-M	Verizon (existing)	Low-Profile Platform	140'	(12) 1 5/8" coax cables (within monopole)
(12) DB844H90 antennas	Nextel (existing)	Low-Profile Platform	130'	(12) 1 1/4" coax cables (within monopole)
(2) GPS antennas	Nextel (existing)	Low-Profile Platform (listed above)	130'	(3) 1/2" coax cables (within monopole)
(9) DB980F90 antennas	Sprint (existing and future)	Low-Profile Platform	120'	(9) 1 1/4" coax cables (within monopole)
(12) 7250.03 antennas and (6) TMA's	Cingular Blue (existing and future)	Low-Profile Platform	110'	(12) 1 5/8" coax cables (within monopole)
(1) GPS antenna	Sprint (existing)	Stand Off Mount	75'	(1) 1/2" coax cable (within monopole)

This structural analysis of the communications tower was performed by URS Corporation (URS) for Site Acquisitions, Inc./Cingular Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with TIA/EIA-222-F, Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction, Allowable Stress Design (ASD).

The analysis was conducted using ERI Tower 3.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 85 mph Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 74 mph Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the monopole structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were below the allowable stresses. Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report. Additionally, the anchor bolts, base plate, and foundation were found to be structurally adequate.

5. CONCLUSIONS

The results of the analysis indicate that the tower structure is in compliance with the proposed loading conditions. **The tower and its foundation are structurally adequate under the TIA/EIA-222-F wind load classification specified above and the proposed antenna loadings.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed within the monopole unless specified otherwise.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

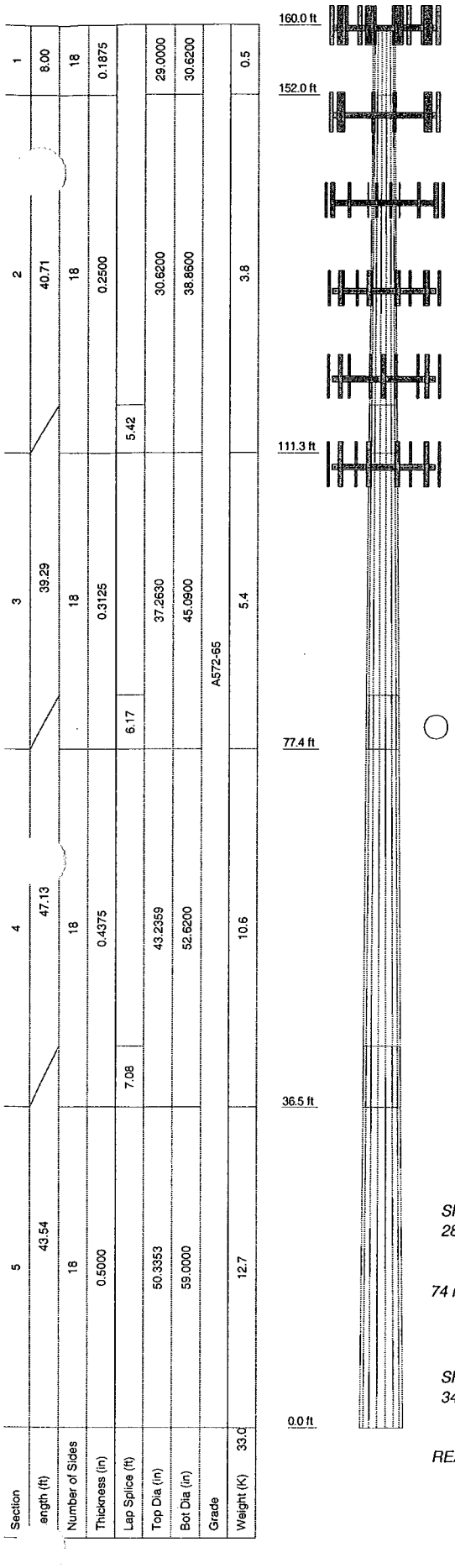
Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

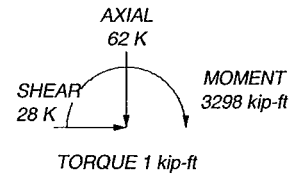
6. DRAWINGS AND DATA

ERI TOWER INPUT/OUTPUT SUMMARY

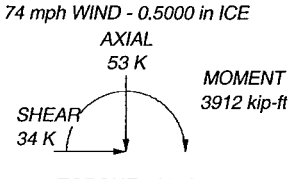


Section	1	2	3	4	5
Length (ft)	8.00	40.71	39.29	47.13	43.54
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.4375	0.5000
Lap Splice (ft)		5.42	6.17	7.08	
Top Dia (in)	29.0000	30.6200	37.2630	43.2359	50.3353
Bot Dia (in)	30.6200	38.8600	45.0900	52.6200	59.0000
Grade			A572-65		
Weight (K)	0.5	3.8	5.4	10.6	12.7

Total Weight: 33.0



TORQUE 1 kip-ft
74 mph WIND - 0.5000 in ICE



TORQUE 1 kip-ft
REACTIONS - 85 mph WIND

APPURTENANCES

TYPE	ELEVATION	TYPE	ELEVATION
(4) DR65-18-02DPL2Q (T-Mobile)	160	DB948F85T2E-M (Verizon)	140
(4) DR65-18-02DPL2Q (T-Mobile)	160	DB844H90 (Verizon)	140
(4) DR65-18-02DPL2Q (T-Mobile)	160	DB844H90 (Verizon)	140
(4) TMA (T-Mobile)	160	DB948F85T2E-M (Verizon)	140
(4) TMA (T-Mobile)	160	DB948F85T2E-M (Verizon)	140
(4) TMA (T-Mobile)	160	Low Profile Platform (Verizon)	140
Low Profile Platform (T-Mobile)	160	(4) DB844H90 (Nextel)	130
(2) 7770.00 (Cingular)	150	(4) DB844H90 (Nextel)	130
(2) LPG13519 Diplexer (Cingular)	150	(4) DB844H90 (Nextel)	130
(2) LPG21401 TMA (Cingular)	150	(2) GPS (Nextel)	130
(2) 7770.00 (Cingular)	150	Low Profile Platform (Nextel)	130
(2) LPG13519 Diplexer (Cingular)	150	(3) DB980F90E-M (Sprint)	120
(2) LPG21401 TMA (Cingular)	150	(3) DB980F90E-M (Sprint)	120
(2) 7770.00 (Cingular)	150	(3) DB980F90E-M (Sprint)	120
(2) LPG13519 Diplexer (Cingular)	150	Low Profile Platform (Sprint)	120
(2) LPG21401 TMA (Cingular)	150	(4) 7250.03 (Cingular Blue)	110
Low Profile Platform (Cingular)	150	(4) 7250.03 (Cingular Blue)	110
DB844H90 (Verizon)	140	(4) 7250.03 (Cingular Blue)	110
DB844H90 (Verizon)	140	(2) TMA (Cingular Blue)	110
DB948F85T2E-M (Verizon)	140	(2) TMA (Cingular Blue)	110
DB948F85T2E-M (Verizon)	140	(2) TMA (Cingular Blue)	110
DB844H90 (Verizon)	140	Low Profile Platform (Cingular Blue)	110
DB844H90 (Verizon)	140	GPS (Sprint)	75
DB948F85T2E-M (Verizon)	140	3' Side Mount Standoff (Sprint)	75

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 70.3%

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: ***160' EEI Monopole***			
Project: ***Greenwich, CT***			
Client: Cingular Wirless	Drawn by: Jed Kiernan	App'd:	
Code: TIA/EIA-222-F	Date: 02/03/06	Scale: NTS	
Path: N:\jkieman\SAI-009\ERI Files\160' Monopole - Greenwich.eri		Dwg No. E-1	

ERI TOWER DETAILED OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	**Poles**
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	160.00-152.00	8.00	0.00	18	29.0000	30.6200	0.1875	0.7500	A572-65 (65 ksi)
L2	152.00-111.29	40.71	5.42	18	30.6200	38.8600	0.2500	1.0000	A572-65 (65 ksi)
L3	111.29-77.42	39.29	6.17	18	37.2630	45.0900	0.3125	1.2500	A572-65 (65 ksi)
L4	77.42-36.46	47.13	7.08	18	43.2359	52.6200	0.4375	1.7500	A572-65 (65 ksi)
L5	36.46-0.00	43.54		18	50.3353	59.0000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	29.4474	17.1470	1798.4090	10.2284	14.7320	122.0750	3599.1844	8.5751	4.7740	25.461
	31.0924	18.1111	2119.1346	10.8035	15.5550	136.2353	4241.0576	9.0573	5.0591	26.982
L2	31.0924	24.0986	2808.1400	10.7814	15.5550	180.5302	5619.9750	12.0516	4.9491	19.796
	39.4595	30.6370	5770.1059	13.7066	19.7409	292.2922	11547.8043	15.3214	6.3994	25.597
L3	38.9342	36.6502	6321.9882	13.1174	18.9296	333.9740	12652.2950	18.3286	6.0083	19.226
	45.7856	44.4137	11250.5543	15.8960	22.9057	491.1679	22515.9125	22.2111	7.3858	23.635
L4	45.1503	59.4309	13753.2024	15.1934	21.9638	626.1754	27524.5016	29.7211	6.8395	15.633
	53.4317	72.4619	24928.5533	18.5248	26.7310	932.5723	49889.9082	36.2378	8.4911	19.408
L5	52.5425	79.0886	24815.6300	17.6915	25.5703	970.4855	49663.9131	39.5518	7.9790	15.958
	59.9102	92.8395	40140.4258	20.7675	29.9720	1339.2642	80333.6694	46.4286	9.5040	19.008

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 160.00-152.00				1	1.02	1		
L2 152.00-111.29				1	1.02	1		
L3 111.29-77.42				1	1.02	1		
L4 77.42-36.46				1	1.02	1		
L5 36.46-0.00				1	1.02	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile)	C	No	Inside Pole	160.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Cingular)	C	No	Inside Pole	150.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Verizon)	C	No	Inside Pole	140.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 1/4 (Nextel)	C	No	Inside Pole	130.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
1 1/4 (Sprint future)	C	No	Inside Pole	120.00 - 0.00	9	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
1 5/8 (Cingular Blue)	C	No	Inside Pole	110.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
7/8 (Verizon)	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
1/2 (Sprint)	C	No	Inside Pole	75.00 - 0.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1/2 (Nextel)	C	No	Inside Pole	130.00 - 0.00	3	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1 5/8 (T-Mobile future)	C	No	Inside Pole	160.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 1/4 (Sprint future)	C	No	Inside Pole	120.00 - 0.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-152.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.20
L2	152.00-111.29	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	2.10
L3	111.29-77.42	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	2.68
L4	77.42-36.46	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	3.27
L5	36.46-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	2.91

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-152.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.20
L2	152.00-111.29	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	2.10
L3	111.29-77.42	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	2.68
L4	77.42-36.46	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	3.27
L5	36.46-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	2.91

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(4) DR65-18-02DPL2Q	A	From Face	3.00	0.0000	160.00	No Ice	6.30	2.42	0.02
(T-Mobile)			0.00			1/2" Ice	6.73	2.76	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	K
			0.00						
(4) DR65-18-02DPL2Q	B	From Face	3.00	0.0000	160.00	No Ice	6.30	2.42	0.02
(T-Mobile)			0.00			1/2" Ice	6.73	2.76	0.06
			0.00						
(4) DR65-18-02DPL2Q	C	From Face	3.00	0.0000	160.00	No Ice	6.30	2.42	0.02
(T-Mobile)			0.00			1/2" Ice	6.73	2.76	0.06
			0.00						
(4) TMA	A	From Face	3.00	0.0000	160.00	No Ice	1.00	1.00	0.01
(T-Mobile)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
(4) TMA	B	From Face	3.00	0.0000	160.00	No Ice	1.00	1.00	0.01
(T-Mobile)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
(4) TMA	C	From Face	3.00	0.0000	160.00	No Ice	1.00	1.00	0.01
(T-Mobile)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
Low Profile Platform	C	None		0.0000	160.00	No Ice	15.70	15.70	1.30
(T-Mobile)						1/2" Ice	20.10	20.10	1.76
(2) 7770.00	A	From Face	3.00	0.0000	150.00	No Ice	5.88	2.93	0.04
(Cingular)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) LPG13519 Diplexer	A	From Face	3.00	0.0000	150.00	No Ice	0.27	0.18	0.01
(Cingular)			0.00			1/2" Ice	0.34	0.25	0.01
			0.00						
(2) LPG21401 TMA	A	From Face	3.00	0.0000	150.00	No Ice	0.95	0.37	0.02
(Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) 7770.00	B	From Face	3.00	0.0000	150.00	No Ice	5.88	2.93	0.04
(Cingular)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) LPG13519 Diplexer	B	From Face	3.00	0.0000	150.00	No Ice	0.27	0.18	0.01
(Cingular)			0.00			1/2" Ice	0.34	0.25	0.01
			0.00						
(2) LPG21401 TMA	B	From Face	3.00	0.0000	150.00	No Ice	0.95	0.37	0.02
(Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) 7770.00	C	From Face	3.00	0.0000	150.00	No Ice	5.88	2.93	0.04
(Cingular)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) LPG13519 Diplexer	C	From Face	3.00	0.0000	150.00	No Ice	0.27	0.18	0.01
(Cingular)			0.00			1/2" Ice	0.34	0.25	0.01
			0.00						
(2) LPG21401 TMA	C	From Face	3.00	0.0000	150.00	No Ice	0.95	0.37	0.02
(Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
Low Profile Platform	C	None		0.0000	150.00	No Ice	15.70	15.70	1.30
(Cingular)						1/2" Ice	20.10	20.10	1.76
DB844H90	A	From Face	3.00	0.0000	140.00	No Ice	2.87	3.97	0.01
(Verizon)			-6.00			1/2" Ice	3.18	4.34	0.04
			0.00						
DB844H90	A	From Face	3.00	0.0000	140.00	No Ice	2.87	3.97	0.01
(Verizon)			6.00			1/2" Ice	3.18	4.34	0.04
			0.00						
DB948F85T2E-M	A	From Face	3.00	0.0000	140.00	No Ice	1.92	3.26	0.01
(Verizon)			-4.00			1/2" Ice	2.22	3.62	0.03
			0.00						
DB948F85T2E-M	A	From Face	3.00	0.0000	140.00	No Ice	1.92	3.26	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon)			4.00 0.00			1/2" Ice	2.22	3.62	0.03
DB844H90	B	From Face	3.00	0.0000	140.00	No Ice	2.87	3.97	0.01
(Verizon)			-6.00 0.00			1/2" Ice	3.18	4.34	0.04
DB844H90	B	From Face	3.00	0.0000	140.00	No Ice	2.87	3.97	0.01
(Verizon)			6.00 0.00			1/2" Ice	3.18	4.34	0.04
DB948F85T2E-M	B	From Face	3.00	0.0000	140.00	No Ice	1.92	3.26	0.01
(Verizon)			-4.00 0.00			1/2" Ice	2.22	3.62	0.03
DB948F85T2E-M	B	From Face	3.00	0.0000	140.00	No Ice	1.92	3.26	0.01
(Verizon)			4.00 0.00			1/2" Ice	2.22	3.62	0.03
DB844H90	C	From Face	3.00	0.0000	140.00	No Ice	2.87	3.97	0.01
(Verizon)			-6.00 0.00			1/2" Ice	3.18	4.34	0.04
DB844H90	C	From Face	3.00	0.0000	140.00	No Ice	2.87	3.97	0.01
(Verizon)			6.00 0.00			1/2" Ice	3.18	4.34	0.04
DB948F85T2E-M	C	From Face	3.00	0.0000	140.00	No Ice	1.92	3.26	0.01
(Verizon)			-4.00 0.00			1/2" Ice	2.22	3.62	0.03
DB948F85T2E-M	C	From Face	3.00	0.0000	140.00	No Ice	1.92	3.26	0.01
(Verizon)			4.00 0.00			1/2" Ice	2.22	3.62	0.03
Low Profile Platform	C	None		0.0000	140.00	No Ice	15.70	15.70	1.30
(Verizon)						1/2" Ice	20.10	20.10	1.76
(4) DB844H90	A	From Face	3.00	0.0000	130.00	No Ice	2.87	3.97	0.01
(Nextel)			0.00 0.00			1/2" Ice	3.18	4.34	0.04
(4) DB844H90	B	From Face	3.00	0.0000	130.00	No Ice	2.87	3.97	0.01
(Nextel)			0.00 0.00			1/2" Ice	3.18	4.34	0.04
(4) DB844H90	C	From Face	3.00	0.0000	130.00	No Ice	2.87	3.97	0.01
(Nextel)			0.00 0.00			1/2" Ice	3.18	4.34	0.04
(2) GPS	C	From Face	3.00	0.0000	130.00	No Ice	1.00	1.00	0.01
(Nextel)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
Low Profile Platform	C	None		0.0000	130.00	No Ice	15.70	15.70	1.30
(Nextel)						1/2" Ice	20.10	20.10	1.76
(3) DB980F90E-M	A	From Face	3.00	0.0000	120.00	No Ice	3.90	2.29	0.01
(Sprint)			0.00 0.00			1/2" Ice	4.28	2.65	0.03
(3) DB980F90E-M	B	From Face	3.00	0.0000	120.00	No Ice	3.90	2.29	0.01
(Sprint)			0.00 0.00			1/2" Ice	4.28	2.65	0.03
(3) DB980F90E-M	C	From Face	3.00	0.0000	120.00	No Ice	3.90	2.29	0.01
(Sprint)			0.00 0.00			1/2" Ice	4.28	2.65	0.03
Low Profile Platform	C	None		0.0000	120.00	No Ice	15.70	15.70	1.30
(Sprint)						1/2" Ice	20.10	20.10	1.76
(4) 7250.03	A	From Face	3.00	0.0000	110.00	No Ice	4.00	1.87	0.02
(Cingular Blue)			0.00 0.00			1/2" Ice	4.39	2.33	0.04
(4) 7250.03	B	From Face	3.00	0.0000	110.00	No Ice	4.00	1.87	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Cingular Blue)			0.00 0.00			1/2" Ice	4.39	2.33	0.04
(4) 7250.03	C	From Face	3.00	0.0000	110.00	No Ice	4.00	1.87	0.02
(Cingular Blue)			0.00 0.00			1/2" Ice	4.39	2.33	0.04
(2) TMA	B	From Face	3.00	0.0000	110.00	No Ice	1.00	1.00	0.01
(Cingular Blue)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
(2) TMA	C	From Face	3.00	0.0000	110.00	No Ice	1.00	1.00	0.01
(Cingular Blue)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
(2) TMA	A	From Face	3.00	0.0000	110.00	No Ice	1.00	1.00	0.01
(Cingular Blue)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
Low Profile Platform	C	None		0.0000	110.00	No Ice	15.70	15.70	1.30
(Cingular Blue)						1/2" Ice	20.10	20.10	1.76
GPS	C	From Face	3.00	0.0000	75.00	No Ice	1.00	1.00	0.01
(Sprint)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
3' Side Mount Standoff	C	From Face	1.50	0.0000	75.00	No Ice	2.72	2.72	0.05
(Sprint)			0.00 0.00			1/2" Ice	4.91	4.91	0.09

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 160.00-152.00	155.96	1.559	29	19.873	A	0.000	20.271	20.271	100.00	0.000	0.000
					B	0.000	20.271		100.00		
					C	0.000	20.271		100.00		
L2 152.00-111.29	131.06	1.483	27	117.855	A	0.000	120.213	120.213	100.00	0.000	0.000
					B	0.000	120.213		100.00		
					C	0.000	120.213		100.00		
L3 111.29-77.42	94.12	1.349	25	117.744	A	0.000	120.099	120.099	100.00	0.000	0.000
					B	0.000	120.099		100.00		
					C	0.000	120.099		100.00		
L4 77.42-36.46	56.90	1.168	21	165.691	A	0.000	169.004	169.004	100.00	0.000	0.000
					B	0.000	169.004		100.00		
					C	0.000	169.004		100.00		
L5 36.46-0.00	17.83	1	18	168.239	A	0.000	171.604	171.604	100.00	0.000	0.000
					B	0.000	171.604		100.00		
					C	0.000	171.604		100.00		

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face e	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-152.00	155.96	1.559	22	0.5000	20.540	A	0.000	20.951	20.951	100.00	0.000	0.000
						B	0.000	20.951		100.00		
						C	0.000	20.951		100.00		
L2 152.00-111.29	131.06	1.483	21	0.5000	121.248	A	0.000	123.673	123.673	100.00	0.000	0.000
						B	0.000	123.673		100.00		
						C	0.000	123.673		100.00		
L3 111.29-77.42	94.12	1.349	19	0.5000	120.567	A	0.000	122.978	122.978	100.00	0.000	0.000
						B	0.000	122.978		100.00		
						C	0.000	122.978		100.00		
L4 77.42-36.46	56.90	1.168	16	0.5000	169.104	A	0.000	172.486	172.486	100.00	0.000	0.000
						B	0.000	172.486		100.00		
						C	0.000	172.486		100.00		
L5 36.46-0.00	17.83	1	14	0.5000	171.277	A	0.000	174.703	174.703	100.00	0.000	0.000
						B	0.000	174.703		100.00		
						C	0.000	174.703		100.00		

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face e	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-152.00	155.96	1.559	10	19.873	A	0.000	20.271	20.271	100.00	0.000	0.000
					B	0.000	20.271		100.00		
					C	0.000	20.271		100.00		
L2 152.00-111.29	131.06	1.483	9	117.855	A	0.000	120.213	120.213	100.00	0.000	0.000
					B	0.000	120.213		100.00		
					C	0.000	120.213		100.00		
L3 111.29-77.42	94.12	1.349	9	117.744	A	0.000	120.099	120.099	100.00	0.000	0.000
					B	0.000	120.099		100.00		
					C	0.000	120.099		100.00		
L4 77.42-36.46	56.90	1.168	7	165.691	A	0.000	169.004	169.004	100.00	0.000	0.000
					B	0.000	169.004		100.00		
					C	0.000	169.004		100.00		
L5 36.46-0.00	17.83	1	6	168.239	A	0.000	171.604	171.604	100.00	0.000	0.000
					B	0.000	171.604		100.00		
					C	0.000	171.604		100.00		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.64	80.24	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	3.62	88.88	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	3.29	97.05	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	3.99	97.36	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	3.49	95.63	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	1172.77 kip-ft	15.02		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.64	80.24	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	3.62	88.88	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	3.29	97.05	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	3.99	97.36	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	3.49	95.63	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	1172.77 kip-ft	15.02		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.64	80.24	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	3.62	88.88	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	3.29	97.05	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	3.99	97.36	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	3.49	95.63	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	1172.77 kip-ft	15.02		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.64	80.24	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	3.62	88.88	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	3.29	97.05	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	3.99	97.36	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	3.49	95.63	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	1172.77 kip-ft	15.02		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.63	A	1	0.65	1	1	1	20.951	0.50	62.20	C
			B	1	0.65	1	1	1	20.951			
			C	1	0.65	1	1	1	20.951			
L2 152.00-111.29	2.10	4.68	A	1	0.65	1	1	1	123.673	2.79	68.58	C
			B	1	0.65	1	1	1	123.673			
			C	1	0.65	1	1	1	123.673			
L3 111.29-77.42	2.68	6.30	A	1	0.65	1	1	1	122.978	2.52	74.53	C
			B	1	0.65	1	1	1	122.978			
			C	1	0.65	1	1	1	122.978			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L4 77.42-36.46	3.27	11.82	A	1	0.65	1	1	1	172.486	3.05	74.52	C
			B	1	0.65	1	1	1	172.486			
			C	1	0.65	1	1	1	172.486			
L5 36.46-0.00	2.91	13.99	A	1	0.65	1	1	1	174.703	2.66	73.02	C
			B	1	0.65	1	1	1	174.703			
			C	1	0.65	1	1	1	174.703			
Sum Weight:	11.16	37.42						OTM	902.25 kip-ft	11.53		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.63	A	1	0.65	1	1	1	20.951	0.50	62.20	C
			B	1	0.65	1	1	1	20.951			
			C	1	0.65	1	1	1	20.951			
L2 152.00-111.29	2.10	4.68	A	1	0.65	1	1	1	123.673	2.79	68.58	C
			B	1	0.65	1	1	1	123.673			
			C	1	0.65	1	1	1	123.673			
L3 111.29-77.42	2.68	6.30	A	1	0.65	1	1	1	122.978	2.52	74.53	C
			B	1	0.65	1	1	1	122.978			
			C	1	0.65	1	1	1	122.978			
L4 77.42-36.46	3.27	11.82	A	1	0.65	1	1	1	172.486	3.05	74.52	C
			B	1	0.65	1	1	1	172.486			
			C	1	0.65	1	1	1	172.486			
L5 36.46-0.00	2.91	13.99	A	1	0.65	1	1	1	174.703	2.66	73.02	C
			B	1	0.65	1	1	1	174.703			
			C	1	0.65	1	1	1	174.703			
Sum Weight:	11.16	37.42						OTM	902.25 kip-ft	11.53		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.63	A	1	0.65	1	1	1	20.951	0.50	62.20	C
			B	1	0.65	1	1	1	20.951			
			C	1	0.65	1	1	1	20.951			
L2 152.00-111.29	2.10	4.68	A	1	0.65	1	1	1	123.673	2.79	68.58	C
			B	1	0.65	1	1	1	123.673			
			C	1	0.65	1	1	1	123.673			
L3 111.29-77.42	2.68	6.30	A	1	0.65	1	1	1	122.978	2.52	74.53	C
			B	1	0.65	1	1	1	122.978			
			C	1	0.65	1	1	1	122.978			
L4 77.42-36.46	3.27	11.82	A	1	0.65	1	1	1	172.486	3.05	74.52	C
			B	1	0.65	1	1	1	172.486			
			C	1	0.65	1	1	1	172.486			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L5 36.46-0.00	2.91	13.99	A	1	0.65	1	1	1	174.703	2.66	73.02	C
			B	1	0.65	1	1	1	174.703			
			C	1	0.65	1	1	1	174.703			
Sum Weight:	11.16	37.42						OTM	902.25 kip-ft	11.53		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.63	A	1	0.65	1	1	1	20.951	0.50	62.20	C
			B	1	0.65	1	1	1	20.951			
			C	1	0.65	1	1	1	20.951			
L2 152.00-111.29	2.10	4.68	A	1	0.65	1	1	1	123.673	2.79	68.58	C
			B	1	0.65	1	1	1	123.673			
			C	1	0.65	1	1	1	123.673			
L3 111.29-77.42	2.68	6.30	A	1	0.65	1	1	1	122.978	2.52	74.53	C
			B	1	0.65	1	1	1	122.978			
			C	1	0.65	1	1	1	122.978			
L4 77.42-36.46	3.27	11.82	A	1	0.65	1	1	1	172.486	3.05	74.52	C
			B	1	0.65	1	1	1	172.486			
			C	1	0.65	1	1	1	172.486			
L5 36.46-0.00	2.91	13.99	A	1	0.65	1	1	1	174.703	2.66	73.02	C
			B	1	0.65	1	1	1	174.703			
			C	1	0.65	1	1	1	174.703			
Sum Weight:	11.16	37.42						OTM	902.25 kip-ft	11.53		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.22	27.76	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	1.25	30.75	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	1.14	33.58	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	1.38	33.69	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	1.21	33.09	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	11.16	33.00						OTM	405.80 kip-ft	5.20		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.22	27.76	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	1.25	30.75	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	1.14	33.58	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	1.38	33.69	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	1.21	33.09	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	405.80 kip-ft	5.20		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.22	27.76	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	1.25	30.75	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	1.14	33.58	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	1.38	33.69	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	1.21	33.09	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	405.80 kip-ft	5.20		

ERITower	Job	Page
	160' EEI Monopole	13 of 22
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	**Project** Greenwich, CT	**Date** 09:16:02 02/03/06
	Client Cingular Wirless	**Designed by** Jed Kiernan

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 160.00-152.00	0.20	0.48	A	1	0.65	1	1	1	20.271	0.22	27.76	C
			B	1	0.65	1	1	1	20.271			
			C	1	0.65	1	1	1	20.271			
L2 152.00-111.29	2.10	3.79	A	1	0.65	1	1	1	120.213	1.25	30.75	C
			B	1	0.65	1	1	1	120.213			
			C	1	0.65	1	1	1	120.213			
L3 111.29-77.42	2.68	5.42	A	1	0.65	1	1	1	120.099	1.14	33.58	C
			B	1	0.65	1	1	1	120.099			
			C	1	0.65	1	1	1	120.099			
L4 77.42-36.46	3.27	10.58	A	1	0.65	1	1	1	169.004	1.38	33.69	C
			B	1	0.65	1	1	1	169.004			
			C	1	0.65	1	1	1	169.004			
L5 36.46-0.00	2.91	12.74	A	1	0.65	1	1	1	171.604	1.21	33.09	C
			B	1	0.65	1	1	1	171.604			
			C	1	0.65	1	1	1	171.604			
Sum Weight:	11.16	33.00						OTM	405.80 kip-ft	5.20		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	33.00					
Bracing Weight	0.00					
Total Member Self-Weight	33.00			0.31	0.00	
Total Weight	53.40			0.31	0.00	
Wind 0 deg - No Ice		0.00	-34.22	-3812.41	0.00	0.00
Wind 30 deg - No Ice		17.11	-29.64	-3301.60	-1906.36	0.48
Wind 45 deg - No Ice		24.20	-24.20	-2695.69	-2695.99	0.68
Wind 60 deg - No Ice		29.64	-17.11	-1906.05	-3301.91	0.84
Wind 90 deg - No Ice		34.22	0.00	0.31	-3812.71	0.97
Wind 120 deg - No Ice		29.64	17.11	1906.66	-3301.91	0.84
Wind 135 deg - No Ice		24.20	24.20	2696.30	-2695.99	0.68
Wind 150 deg - No Ice		17.11	29.64	3302.21	-1906.36	0.48
Wind 180 deg - No Ice		0.00	34.22	3813.02	0.00	0.00
Wind 210 deg - No Ice		-17.11	29.64	3302.21	1906.36	-0.48
Wind 225 deg - No Ice		-24.20	24.20	2696.30	2695.99	-0.68
Wind 240 deg - No Ice		-29.64	17.11	1906.66	3301.91	-0.84
Wind 270 deg - No Ice		-34.22	0.00	0.31	3812.71	-0.97
Wind 300 deg - No Ice		-29.64	-17.11	-1906.05	3301.91	-0.84
Wind 315 deg - No Ice		-24.20	-24.20	-2695.69	2695.99	-0.68
Wind 330 deg - No Ice		-17.11	-29.64	-3301.60	1906.36	-0.48
Member Ice	4.41					
Total Weight Ice	62.33			0.51	0.00	
Wind 0 deg - Ice		0.00	-28.20	-3187.98	0.00	0.00
Wind 30 deg - Ice		14.10	-24.42	-2760.81	-1594.25	0.59
Wind 45 deg - Ice		19.94	-19.94	-2254.10	-2254.60	0.83
Wind 60 deg - Ice		24.42	-14.10	-1593.74	-2761.31	1.01

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 90 deg - Ice		28.20	0.00	0.51	-3188.49	1.17
Wind 120 deg - Ice		24.42	14.10	1594.75	-2761.31	1.01
Wind 135 deg - Ice		19.94	19.94	2255.11	-2254.60	0.83
Wind 150 deg - Ice		14.10	24.42	2761.82	-1594.25	0.59
Wind 180 deg - Ice		0.00	28.20	3189.00	0.00	0.00
Wind 210 deg - Ice		-14.10	24.42	2761.82	1594.25	-0.59
Wind 225 deg - Ice		-19.94	19.94	2255.11	2254.60	-0.83
Wind 240 deg - Ice		-24.42	14.10	1594.75	2761.31	-1.01
Wind 270 deg - Ice		-28.20	0.00	0.51	3188.49	-1.17
Wind 300 deg - Ice		-24.42	-14.10	-1593.74	2761.31	-1.01
Wind 315 deg - Ice		-19.94	-19.94	-2254.10	2254.60	-0.83
Wind 330 deg - Ice		-14.10	-24.42	-2760.81	1594.25	-0.59
Total Weight	53.40			0.31	0.00	
Wind 0 deg - Service		0.00	-11.84	-1318.97	0.00	0.00
Wind 30 deg - Service		5.92	-10.26	-1142.22	-659.64	0.17
Wind 45 deg - Service		8.37	-8.37	-932.56	-932.87	0.24
Wind 60 deg - Service		10.26	-5.92	-659.33	-1142.53	0.29
Wind 90 deg - Service		11.84	0.00	0.31	-1319.28	0.33
Wind 120 deg - Service		10.26	5.92	659.95	-1142.53	0.29
Wind 135 deg - Service		8.37	8.37	933.18	-932.87	0.24
Wind 150 deg - Service		5.92	10.26	1142.83	-659.64	0.17
Wind 180 deg - Service		0.00	11.84	1319.58	0.00	0.00
Wind 210 deg - Service		-5.92	10.26	1142.83	659.64	-0.17
Wind 225 deg - Service		-8.37	8.37	933.18	932.87	-0.24
Wind 240 deg - Service		-10.26	5.92	659.95	1142.53	-0.29
Wind 270 deg - Service		-11.84	0.00	0.31	1319.28	-0.33
Wind 300 deg - Service		-10.26	-5.92	-659.33	1142.53	-0.29
Wind 315 deg - Service		-8.37	-8.37	-932.56	932.87	-0.24
Wind 330 deg - Service		-5.92	-10.26	-1142.22	659.64	-0.17

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp

Comb. No.	Description
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 152	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-3.44	0.00	0.00
			Max. Mx	6	-1.96	-44.06	-0.00
			Max. My	10	-1.96	0.00	-44.06
			Max. Vy	6	5.85	-44.06	-0.00
			Max. Vx	10	5.85	0.00	-44.06
			Max. Torque	5			0.00
L2	152 - 111.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-18.02	0.00	-0.13
			Max. Mx	6	-12.18	-521.59	-0.08
			Max. My	10	-12.18	0.00	-521.68
			Max. Vy	6	20.45	-521.59	-0.08
			Max. Vx	10	20.45	0.00	-521.68
			Max. Torque	23			-0.47
L3	111.29 - 77.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-28.67	0.00	-0.13
			Max. Mx	6	-21.39	-1336.80	-0.10
			Max. My	10	-21.39	0.00	-1336.89
			Max. Vy	6	26.86	-1336.80	-0.10
			Max. Vx	10	26.86	0.00	-1336.89
			Max. Torque	23			-0.46
L4	77.42 - 36.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-42.92	0.00	-0.51
			Max. Mx	6	-34.85	-2494.79	-0.31
			Max. My	10	-34.85	0.00	-2495.11

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	6	30.76	-2494.79	-0.31
			Max. Vx	10	30.76	0.00	-2495.11
			Max. Torque	23			-1.17
L5	36.46 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-62.33	0.00	-0.51
			Max. Mx	6	-53.38	-3912.14	-0.32
			Max. My	10	-53.38	0.00	-3912.46
			Max. Vy	6	34.25	-3912.14	-0.32
			Max. Vx	10	34.25	0.00	-3912.46
			Max. Torque	23			-1.17

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	62.33	0.00	-28.20
	Max. H_x	14	53.40	34.22	-0.00
	Max. H_z	2	53.40	0.00	34.22
	Max. M_x	2	3911.82	0.00	34.22
	Max. M_z	6	3912.14	-34.22	-0.00
	Max. Torsion	31	1.17	28.20	0.00
	Min. Vert	1	53.40	0.00	0.00
	Min. H_x	6	53.40	-34.22	-0.00
	Min. H_z	10	53.40	0.00	-34.22
	Min. M_x	10	-3912.46	0.00	-34.22
	Min. M_z	14	-3912.14	34.22	-0.00
	Min. Torsion	23	-1.17	-28.20	0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	53.40	0.00	0.00	0.31	0.00	0.00
Dead+Wind 0 deg - No Ice	53.40	0.00	-34.22	-3911.82	0.00	0.00
Dead+Wind 30 deg - No Ice	53.40	17.11	-29.64	-3387.70	-1956.07	0.48
Dead+Wind 45 deg - No Ice	53.40	24.20	-24.20	-2765.99	-2766.30	0.68
Dead+Wind 60 deg - No Ice	53.40	29.64	-17.11	-1955.76	-3388.01	0.83
Dead+Wind 90 deg - No Ice	53.40	34.22	0.00	0.31	-3912.14	0.96
Dead+Wind 120 deg - No Ice	53.40	29.64	17.11	1956.39	-3388.02	0.83
Dead+Wind 135 deg - No Ice	53.40	24.20	24.20	2766.62	-2766.30	0.68
Dead+Wind 150 deg - No Ice	53.40	17.11	29.64	3388.33	-1956.07	0.48
Dead+Wind 180 deg - No Ice	53.40	0.00	34.22	3912.46	0.00	0.00
Dead+Wind 210 deg - No Ice	53.40	-17.11	29.64	3388.33	1956.07	-0.48
Dead+Wind 225 deg - No Ice	53.40	-24.20	24.20	2766.62	2766.30	-0.68
Dead+Wind 240 deg - No Ice	53.40	-29.64	17.11	1956.39	3388.02	-0.83
Dead+Wind 270 deg - No Ice	53.40	-34.22	0.00	0.31	3912.14	-0.96
Dead+Wind 300 deg - No Ice	53.40	-29.64	-17.11	-1955.76	3388.01	-0.83
Dead+Wind 315 deg - No Ice	53.40	-24.20	-24.20	-2765.99	2766.30	-0.68
Dead+Wind 330 deg - No Ice	53.40	-17.11	-29.64	-3387.70	1956.07	-0.48
Dead+Ice+Temp	62.33	0.00	0.00	0.51	0.00	0.00
Dead+Wind 0 deg+Ice+Temp	62.33	0.00	-28.20	-3296.69	0.00	0.00

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 30 deg+Ice+Temp	62.33	14.10	-24.42	-2854.95	-1648.61	0.58
Dead+Wind 45 deg+Ice+Temp	62.33	19.94	-19.94	-2330.96	-2331.48	0.83
Dead+Wind 60 deg+Ice+Temp	62.33	24.42	-14.10	-1648.08	-2855.47	1.01
Dead+Wind 90 deg+Ice+Temp	62.33	28.20	0.00	0.53	-3297.22	1.17
Dead+Wind 120 deg+Ice+Temp	62.33	24.42	14.10	1649.14	-2855.48	1.01
Dead+Wind 135 deg+Ice+Temp	62.33	19.94	19.94	2332.01	-2331.49	0.83
Dead+Wind 150 deg+Ice+Temp	62.33	14.10	24.42	2856.00	-1648.61	0.58
Dead+Wind 180 deg+Ice+Temp	62.33	0.00	28.20	3297.75	0.00	0.00
Dead+Wind 210 deg+Ice+Temp	62.33	-14.10	24.42	2856.00	1648.61	-0.58
Dead+Wind 225 deg+Ice+Temp	62.33	-19.94	19.94	2332.01	2331.49	-0.83
Dead+Wind 240 deg+Ice+Temp	62.33	-24.42	14.10	1649.14	2855.48	-1.01
Dead+Wind 270 deg+Ice+Temp	62.33	-28.20	0.00	0.53	3297.22	-1.17
Dead+Wind 300 deg+Ice+Temp	62.33	-24.42	-14.10	-1648.08	2855.47	-1.01
Dead+Wind 315 deg+Ice+Temp	62.33	-19.94	-19.94	-2330.96	2331.48	-0.83
Dead+Wind 330 deg+Ice+Temp	62.33	-14.10	-24.42	-2854.95	1648.61	-0.58
Dead+Wind 0 deg - Service	53.40	0.00	-11.84	-1354.18	0.00	0.00
Dead+Wind 30 deg - Service	53.40	5.92	-10.26	-1172.71	-677.25	0.17
Dead+Wind 45 deg - Service	53.40	8.37	-8.37	-957.45	-957.77	0.24
Dead+Wind 60 deg - Service	53.40	10.26	-5.92	-676.93	-1173.03	0.29
Dead+Wind 90 deg - Service	53.40	11.84	0.00	0.32	-1354.49	0.33
Dead+Wind 120 deg - Service	53.40	10.26	5.92	677.56	-1173.03	0.29
Dead+Wind 135 deg - Service	53.40	8.37	8.37	958.09	-957.77	0.24
Dead+Wind 150 deg - Service	53.40	5.92	10.26	1173.34	-677.25	0.17
Dead+Wind 180 deg - Service	53.40	0.00	11.84	1354.81	0.00	0.00
Dead+Wind 210 deg - Service	53.40	-5.92	10.26	1173.34	677.25	-0.17
Dead+Wind 225 deg - Service	53.40	-8.37	8.37	958.09	957.77	-0.24
Dead+Wind 240 deg - Service	53.40	-10.26	5.92	677.56	1173.03	-0.29
Dead+Wind 270 deg - Service	53.40	-11.84	0.00	0.32	1354.49	-0.33
Dead+Wind 300 deg - Service	53.40	-10.26	-5.92	-676.93	1173.03	-0.29
Dead+Wind 315 deg - Service	53.40	-8.37	-8.37	-957.45	957.77	-0.24
Dead+Wind 330 deg - Service	53.40	-5.92	-10.26	-1172.71	677.25	-0.17

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-53.40	0.00	0.00	53.40	0.00	0.000%
2	0.00	-53.40	-34.22	0.00	53.40	34.22	0.000%
3	17.11	-53.40	-29.64	-17.11	53.40	29.64	0.000%
4	24.20	-53.40	-24.20	-24.20	53.40	24.20	0.000%
5	29.64	-53.40	-17.11	-29.64	53.40	17.11	0.000%
6	34.22	-53.40	0.00	-34.22	53.40	-0.00	0.000%
7	29.64	-53.40	17.11	-29.64	53.40	-17.11	0.000%
8	24.20	-53.40	24.20	-24.20	53.40	-24.20	0.000%
9	17.11	-53.40	29.64	-17.11	53.40	-29.64	0.000%
10	0.00	-53.40	34.22	0.00	53.40	-34.22	0.000%
11	-17.11	-53.40	29.64	17.11	53.40	-29.64	0.000%
12	-24.20	-53.40	24.20	24.20	53.40	-24.20	0.000%
13	-29.64	-53.40	17.11	29.64	53.40	-17.11	0.000%
14	-34.22	-53.40	0.00	34.22	53.40	-0.00	0.000%
15	-29.64	-53.40	-17.11	29.64	53.40	17.11	0.000%
16	-24.20	-53.40	-24.20	24.20	53.40	24.20	0.000%
17	-17.11	-53.40	-29.64	17.11	53.40	29.64	0.000%
18	0.00	-62.33	0.00	0.00	62.33	0.00	0.000%
19	0.00	-62.33	-28.20	0.00	62.33	28.20	0.000%
20	14.10	-62.33	-24.42	-14.10	62.33	24.42	0.000%
21	19.94	-62.33	-19.94	-19.94	62.33	19.94	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
22	24.42	-62.33	-14.10	-24.42	62.33	14.10	0.000%
23	28.20	-62.33	0.00	-28.20	62.33	0.00	0.000%
24	24.42	-62.33	14.10	-24.42	62.33	-14.10	0.000%
25	19.94	-62.33	19.94	-19.94	62.33	-19.94	0.000%
26	14.10	-62.33	24.42	-14.10	62.33	-24.42	0.000%
27	0.00	-62.33	28.20	0.00	62.33	-28.20	0.000%
28	-14.10	-62.33	24.42	14.10	62.33	-24.42	0.000%
29	-19.94	-62.33	19.94	19.94	62.33	-19.94	0.000%
30	-24.42	-62.33	14.10	24.42	62.33	-14.10	0.000%
31	-28.20	-62.33	0.00	28.20	62.33	0.00	0.000%
32	-24.42	-62.33	-14.10	24.42	62.33	14.10	0.000%
33	-19.94	-62.33	-19.94	19.94	62.33	19.94	0.000%
34	-14.10	-62.33	-24.42	14.10	62.33	24.42	0.000%
35	0.00	-53.40	-11.84	0.00	53.40	11.84	0.000%
36	5.92	-53.40	-10.26	-5.92	53.40	10.26	0.000%
37	8.37	-53.40	-8.37	-8.37	53.40	8.37	0.000%
38	10.26	-53.40	-5.92	-10.26	53.40	5.92	0.000%
39	11.84	-53.40	0.00	-11.84	53.40	0.00	0.000%
40	10.26	-53.40	5.92	-10.26	53.40	-5.92	0.000%
41	8.37	-53.40	8.37	-8.37	53.40	-8.37	0.000%
42	5.92	-53.40	10.26	-5.92	53.40	-10.26	0.000%
43	0.00	-53.40	11.84	0.00	53.40	-11.84	0.000%
44	-5.92	-53.40	10.26	5.92	53.40	-10.26	0.000%
45	-8.37	-53.40	8.37	8.37	53.40	-8.37	0.000%
46	-10.26	-53.40	5.92	10.26	53.40	-5.92	0.000%
47	-11.84	-53.40	0.00	11.84	53.40	0.00	0.000%
48	-10.26	-53.40	-5.92	10.26	53.40	5.92	0.000%
49	-8.37	-53.40	-8.37	8.37	53.40	8.37	0.000%
50	-5.92	-53.40	-10.26	5.92	53.40	10.26	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00008910
3	Yes	5	0.00000001	0.00021662
4	Yes	5	0.00000001	0.00024169
5	Yes	5	0.00000001	0.00021295
6	Yes	4	0.00000001	0.00019188
7	Yes	5	0.00000001	0.00021773
8	Yes	5	0.00000001	0.00024179
9	Yes	5	0.00000001	0.00021400
10	Yes	4	0.00000001	0.00008912
11	Yes	5	0.00000001	0.00021400
12	Yes	5	0.00000001	0.00024179
13	Yes	5	0.00000001	0.00021773
14	Yes	4	0.00000001	0.00019188
15	Yes	5	0.00000001	0.00021295
16	Yes	5	0.00000001	0.00024169
17	Yes	5	0.00000001	0.00021662
18	Yes	4	0.00000001	0.00000001
19	Yes	5	0.00000001	0.00013537
20	Yes	5	0.00000001	0.00040393
21	Yes	5	0.00000001	0.00045374
22	Yes	5	0.00000001	0.00039841

23	Yes	5	0.00000001	0.00013587
24	Yes	5	0.00000001	0.00040579
25	Yes	5	0.00000001	0.00045405
26	Yes	5	0.00000001	0.00040012
27	Yes	5	0.00000001	0.00013542
28	Yes	5	0.00000001	0.00040012
29	Yes	5	0.00000001	0.00045405
30	Yes	5	0.00000001	0.00040579
31	Yes	5	0.00000001	0.00013587
32	Yes	5	0.00000001	0.00039841
33	Yes	5	0.00000001	0.00045374
34	Yes	5	0.00000001	0.00040393
35	Yes	4	0.00000001	0.00004308
36	Yes	4	0.00000001	0.00046195
37	Yes	4	0.00000001	0.00052473
38	Yes	4	0.00000001	0.00044471
39	Yes	4	0.00000001	0.00005127
40	Yes	4	0.00000001	0.00046762
41	Yes	4	0.00000001	0.00052545
42	Yes	4	0.00000001	0.00044972
43	Yes	4	0.00000001	0.00004311
44	Yes	4	0.00000001	0.00044972
45	Yes	4	0.00000001	0.00052545
46	Yes	4	0.00000001	0.00046762
47	Yes	4	0.00000001	0.00005127
48	Yes	4	0.00000001	0.00044471
49	Yes	4	0.00000001	0.00052473
50	Yes	4	0.00000001	0.00046195

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* ft	*Horz. Deflection* in	*Gov. Load Comb.*	*Tilt* °	*Twist* °
L1	160 - 152	25.064	43	1.3221	0.0007
L2	152 - 111.29	22.853	43	1.3136	0.0007
L3	116.71 - 77.42	13.695	43	1.1158	0.0006
L4	83.59 - 36.46	6.965	43	0.7813	0.0004
L5	43.54 - 0	1.914	43	0.3938	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	*Appurtenance*	*Gov. Load Comb.*	*Deflection* in	*Tilt* °	*Twist* °	*Radius of Curvature* ft
160.00	(4) DR65-18-02DPL2Q	43	25.064	1.3221	0.0007	47855
150.00	(2) 7770.00	43	22.304	1.3095	0.0007	24843
140.00	DB844H90	43	19.592	1.2742	0.0007	13357
130.00	(4) DB844H90	43	16.970	1.2173	0.0007	9143
120.00	(3) DB980F90E-M	43	14.479	1.1432	0.0006	6955
110.00	(4) 7250.03	43	12.159	1.0561	0.0005	6301
75.00	GPS	43	5.581	0.6829	0.0003	5580

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	72.316	10	3.8154	0.0024
L2	152 - 111.29	65.941	10	3.7909	0.0024
L3	116.71 - 77.42	39.527	10	3.2205	0.0020
L4	83.59 - 36.46	20.106	10	2.2554	0.0013
L5	43.54 - 0	5.527	10	1.1369	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	(4) DR65-18-02DPL2Q	10	72.316	3.8154	0.0024	16735
150.00	(2) 7770.00	10	64.357	3.7793	0.0024	8683
140.00	DB844H90	10	56.535	3.6790	0.0024	4664
130.00	(4) DB844H90	10	48.972	3.5161	0.0022	3191
120.00	(3) DB980F90E-M	10	41.787	3.3009	0.0020	2426
110.00	(4) 7250.03	10	35.095	3.0442	0.0018	2196
75.00	GPS	10	16.112	1.9920	0.0011	1938

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	160 - 152 (1)	TP30.62x29x0.1875	8.00	160.00	177.7	4.728	18.1111	-3.16	85.63	0.037
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.71	160.00	144.2	7.184	29.7665	-12.18	213.84	0.057
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	39.29	160.00	124.2	9.682	43.1945	-21.39	418.19	0.051
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	47.13	160.00	106.5	13.160	70.5044	-34.85	927.86	0.038
L5	36.46 - 0 (5)	TP59x50.3353x0.5	43.54	160.00	92.5	17.457	92.8395	-53.38	1620.66	0.033

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	160 - 152 (1)	TP30.62x29x0.1875	38.29	3.373	37.630	0.090	0.00	0.000	37.630	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	521.68	22.693	39.000	0.582	0.00	0.000	39.000	0.000
L3	111.29 - 77.42	TP45.09x37.263x0.3125	1336.89	34.539	39.000	0.886	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L4	(3) 77.42 - 36.46	TP52.62x43.2359x0.4375	2495.11	33.922	39.000	0.870	0.00	0.000	39.000	0.000
L5	(4) 36.46 - 0 (5)	TP59x50.3353x0.5	3912.46	35.056	39.000	0.899	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	160 - 152 (1)	TP30.62x29x0.1875	5.06	0.279	26.000	0.021	0.00	0.000	26.000	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	20.45	0.687	26.000	0.053	0.00	0.000	26.000	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	26.86	0.622	26.000	0.048	0.00	0.000	26.000	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	30.76	0.436	26.000	0.034	0.00	0.000	26.000	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	34.25	0.369	26.000	0.029	0.00	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.037	0.090	0.000	0.021	0.000	0.127 ✔	1.333	H1-3+VT ✔
L2	152 - 111.29 (2)	0.057	0.582	0.000	0.053	0.000	0.640 ✔	1.333	H1-3+VT ✔
L3	111.29 - 77.42 (3)	0.051	0.886	0.000	0.048	0.000	0.937 ✔	1.333	H1-3+VT ✔
L4	77.42 - 36.46 (4)	0.038	0.870	0.000	0.034	0.000	0.908 ✔	1.333	H1-3+VT ✔
L5	36.46 - 0 (5)	0.033	0.899	0.000	0.029	0.000	0.932 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 152	Pole	TP30.62x29x0.1875	1	-3.16	114.14	9.5	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-12.18	285.05	48.0	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-21.39	557.45	70.3	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-34.85	1236.84	68.1	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-53.38	2160.34	69.9	Pass
							Summary	
						Pole (L3)	70.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						RATING =	**70.3**	**Pass**

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ANCHOR BOLT AND BASE PLATE ANALYSIS

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	$OM := 5136.9 \cdot ft \cdot kips$	*user input*	
Shear Force:	$Shear := 47 \cdot kips$	*user input*	Original Design Reactions - Conservative
Axial Force:	$Axial := 55 \cdot kips$	*user input*	

Anchor Bolt Data:

Use ASTM 615 Grade 75

Number of Anchor Bolts = N	$N := 24$	*user input*
Diameter of Bolt Circle:	$D_{bc} := 67in$	*user input*
Bolt "Column" Distance:	$l := 3in$	*user input*
Bolt Ultimate Strength:	$F_u := 100 \cdot ksi$	*user input*
Bolt Yield Strength:	$Fy := 75 \cdot ksi$	*user input*
Bolt Modulus:	$E := 29000 \cdot ksi$	*user input*
Thickness Of Anchor Bolts	$D := 2.25in$	*user input*
Threads per Inch:	$n := 4.5$	*user input*

Base Plate Data:

Plate Yield Strength:	$Fy_{bp} := 60 \cdot ksi$	*user input*
Base Plate Thickness:	$PlateThickness := 2.25 \cdot in$	*user input*
Base Plate Diameter:	$D_{bp} := 73 \cdot in$	*user input*
Outer Pole Diameter:	$D_{pole} := 59in$	*user input*

Geometric Layout Data:

Distance from the center of gravity of the group to bolt in question = d(i)

Radius of Bolt Circle: $R_{bc} := \frac{D_{bc}}{2}$

Distance to Bolts: $i := 1..N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 8.67\,in$ $d_7 = 32.36\,in$

$d_2 = 16.75\,in$ $d_8 = 29.01\,in$

$d_3 = 23.69\,in$ $d_9 = 23.69\,in$

$d_4 = 29.01\,in$ $d_{10} = 16.75\,in$

$d_5 = 32.36\,in$ $d_{11} = 8.67\,in$

$d_6 = 33.50\,in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 29.50\,in$

Moment Arms of Bolts about Neutral Axis: $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00\,in$ $MA_7 = 2.86\,in$

$MA_2 = 0.00\,in$ $MA_8 = 0.00\,in$

$MA_3 = 0.00\,in$ $MA_9 = 0.00\,in$

$MA_4 = 0.00\,in$ $MA_{10} = 0.00\,in$

$MA_5 = 2.86\,in$ $MA_{11} = 0.00\,in$

$MA_6 = 4.00\,in$ etc.

Effective Width of Baseplate for Bending: $EffectiveWidth := 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2}$ $EffectiveWidth = 42.99\,in$

Anchor Bolt Analysis:

Polar Moment of Inertia I_p:

$$I_p := \sum_i \left(d_i\right)^2 \qquad I_p = 1.347 \times 10^4\,\text{in}^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 3.976\,\text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot\text{in}}{n}\right)^2 \qquad A_n = 3.248\,\text{in}^2$$

Net Diameter:

$$D_n := \frac{2\cdot\sqrt{A_n}}{\sqrt{\pi}} \qquad D_n = 2.03\,\text{in}$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.51\,\text{in}$$

Section Modulus of Bolt:

$$S_x := \frac{\pi\cdot D_n^{\,3}}{32} \qquad S_x = 0.826\,\text{in}^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{\text{Shear}}{N}\right)\cdot 1 \qquad M_x = 0.490\,\text{ft}\cdot\text{kips}$$

$$f_{bx} := \frac{M_x}{S_x} \qquad f_{bx} = 7.1\,\text{ksi}$$

Allowable Bending

$$F_{bx} := 1.33\cdot 0.60\cdot Fy \qquad F_{bx} = 59.8\,\text{ksi}$$

Note: 1.33 increase allowed per TIA/EIA

Check Tensile Forces:

Allowable Tensile Force:

$AllowableTension := 1.33 \cdot (0.33 \cdot A_g \cdot F_u)$ $AllowableTension = 174.5\,kips$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$MaxTension := \frac{OM \cdot R_{bc}}{I_p} - \frac{Axial}{N}$ $MaxTension = 151.0\,kips$

Check Stresses:

$\frac{MaxTension}{AllowableTension} = 0.87$

$Condition := if\left(\frac{MaxTension}{AllowableTension} \le 1.00, "OK", "Overstressed"\right)$

$Condition = "OK"$

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0.00\,\text{in} & \text{otherwise} \end{cases} \qquad l = 0.00\,\text{in}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0\,\text{ksi} & \text{otherwise} \end{cases} \qquad f_{bx} = 0.0\,\text{ksi}$$

Allowable Compressive Force:

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{Fy}} \qquad C_c = 87.36$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot Fy}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} \qquad F_a = 45.0\,\text{ksi}$$

$$F_a := 1.33 \cdot F_a \quad \text{Note: 1.33 increase allowed per TIA/EIA} \qquad F_a = 59.9\,\text{ksi}$$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{\text{Axial}}{N} \qquad \text{MaxCompression} = 155.6\,\text{kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \qquad f_a = 47.9\,\text{ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.80$$

$$\text{Condition} := \text{if}\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \qquad \boxed{\text{Condition} = \text{"OK"}}$$

Base Plate Analysis:

Force from Bolt(s):

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

$C_1 = 42.0\,kips$ $C_7 = 150.4\,kips$

$C_2 = 79.0\,kips$ $C_8 = 135.1\,kips$

$C_3 = 110.7\,kips$ $C_9 = 110.7\,kips$

$C_4 = 135.1\,kips$ $C_{10} = 79.0\,kips$

$C_5 = 150.4\,kips$ $C_{11} = 42.0\,kips$

$C_6 = 155.6\,kips$ etc.

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{EffectiveWidth \cdot PlateThickness^2} \qquad f_{bp} = 40.9\,ksi$$

Check Stresses:

$$\frac{f_{bp}}{1.33 \cdot 0.75 Fy_{bp}} = 0.68$$

$$Condition := if\left(\frac{f_{bp}}{1.33 \cdot 0.75 Fy_{bp}} < 1.00, "OK", "Overstressed"\right)$$

Condition = "OK"

FOUNDATION ANALYSIS

MONOPOLE FOUNDATION ANALYSIS

TOWER FORCES:

Moment Caused by Tower	$M_t := 3912 \cdot ft \cdot kips$
Shear at Base of Tower	$S_t := 34kip$
Max Compressive Force	$C_t := 53 \cdot kip$
Height of Tower	$H_t := 160 \cdot ft$
Base Plate Bolt Circle	$MP := 67in$

FOOTING DIMENSIONS:

Overall Depth of Footing	$D_f := 7.5ft$
Length of Pier	$L_p := 5.5 \cdot ft$
Extension of Pier Above Grade	$L_{pag} := 1.0 \cdot ft$
Diameter of Pier	$d_p := 7 \cdot ft$
Thickness of Footing	$T_f := 3.0 \cdot ft$
Width of Footing:	$W_f := 28ft$
Length of Anchor Bolts:	$L_{st} := 96in$
Projection of anchor bolts above pier	$A_{BP} := 12 \cdot in$
Anchor bolts area	$A_{anchor} := 3.97 \cdot in^2$

PROPERTIES:

Compressive Strength of Concrete	$f'c := 4000psi$
Yield Strength of Steel Reinforcement	$fy := 60000 \cdot psi$
Yield Strength of Anchor Bolt	$fya := 75000 \cdot psi$
Internal Friction Angle of Soil	$\phi_s := 10 \cdot deg$
Allowable Bearing Capacity	$q_s := 6000 \cdot psf$
Unit Weight of Soil	$\gamma_s := 110 \cdot pcf$
Unit Weight of Concrete	$\gamma_c := 150 \cdot pcf$
Depth to Neglect	$n := 0ft$
Cohesion of Clay Type Soil Note: Use 0 for Sandy Soil	$c := 0 \cdot ksf$
Seismic Zone Factor: UBC Fig 23-2	$Z := 2$
Coefficient of Friction between soil and Concrete:	$\mu := 0.35$
Clear Cover of Reinforcement Pier:	$Cvr_{pier} := 3 \cdot in$
Clear Cover of Reinforcement Pad:	$Cvr_{pad} := 3 \cdot in$
Anchor Bolt Diameter	$d_{anchor} := 2.25in$

PIER REINFORCEMENT:

Bar Size	$BSpier := 9$	Bar Diameter	$d_{bpier} := 1.128 \cdot in$
Number of Bars	$NBpier := 44$	Bar Area	$A_{bpier} := 1.00 \cdot in^2$

PAD REINFORCEMENT:

TOP:	Bar Size	$BS_{top} := 11$	Bar Diameter	$d_{btop} := 1.410 \cdot in$
	Number of Bars	$NB_{top} := 25$	Bar Area	$A_{btop} := 1.56 \cdot in^2$
BOTTOM:	Bar Size	$BS_{bot} := 11$	Bar Diameter	$d_{bbot} := 1.410 \cdot in$
	Number of Bars	$NB_{bot} := 50$	Bar Area	$A_{bot} := 1.56 \cdot in^2$

Coefficient of Lateral Soil Pressure: $K_p := \dfrac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$ $K_p = 1.4203$

Load Factor (EIA 3.1.1): $LF := \text{if}\left[H_t \le 700 \cdot ft, 1.3, \text{if}\left[H_t \ge 1200, 1.7, 1.3 + \left(\dfrac{H_t - 700}{1200 - 700}\right) \cdot 0.4\right]\right]$ $LF = 1.3$

CHECK ANCHOR STEEL EMBEDMENT

Depth:

$D_{ab} := L_{st} - A_{BP}$ $D_{ab} = 7\,ft$

$L_{anchor} := \frac{(0.11 \cdot fy) \cdot in}{\sqrt{f'c \cdot psi}}$ $L_{anchor} = 8.6963\,ft$

$DepthCheck := if(D_{ab} \geq L_{anchor}, "Okay", "No Good")$

$DepthCheck = "No Good"$ **Note:** anchor plate is provided

STABILITY OF FOOTING

Passive Pressure:

$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p}$ $P_{pn} = 0\,ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$ $P_{pt} = 0.703\,ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}]$ $P_{top} = 0.703\,ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$ $P_{bot} = 1.1717\,ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2}$ $P_{ave} = 0.9374\,ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)]$ $T_p = 3\,ft$

$A_p := W_f T_p$ $A_p = 84\,ft^2$

Ultimate Shear:

$S_u := P_{ave} \cdot A_p$ $S_u = 78.7401\,kip$

Weight of Concrete Pad:

$WT_c := \left[\left(W_f^2 \cdot T_f\right) + d_p^2 L_p\right] \cdot \gamma_c$ $WT_c = 393.225\,kip$

Weight of Soil: above Footing:

$WT_{s1} := \left[W_f^2 \cdot \left(\left|L_p - L_{pag}\right|\right) - \frac{d_p^2 \cdot \pi}{4} \cdot \left(\left|L_p - L_{pag}\right|\right)\right] \cdot \gamma_s$ $WT_{s1} = 369.0302\,kip$

Weight of Soil Wedge at back face:

$WT_{s2} := \left(\frac{D_f^2 \cdot \tan(\phi_s)}{2} \cdot W_f\right) \cdot \gamma_s$ $WT_{s2} = 15.2743\,kip$

Total Weight:

$WT_{tot} := WT_c + WT_{s1} + C_t$ $WT_{tot} = 815.2552\,kip$

Resisting Moment:

$M_r := \left(WT_{tot}\right) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + WT_{s2} \cdot \left(W_f + \frac{D_f \tan(\phi_s)}{3}\right)$ $M_r = 11926.7268\,kip \cdot ft$

Overturning Moment:

$M_{ot} := M_t + S_t \cdot (L_p + T_f)$ $M_{ot} = 4201\,kip \cdot ft$

Factor of Safety:

$FS := \frac{M_r}{M_{ot}}$ $FS_{req} := 2$ $FS = 2.84$

$SafetyCheck := if(FS > FS_{req}, "Okay", "No Good")$ $SafetyCheck = "Okay"$

SHEAR CAPACITY IN PIER

$FS := 2$

$$S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS}$$

$S_p = 182.0397\,\text{kips}$

$\text{ShearCheck} := \text{if}(S_p > S_t, \text{"Okay"}, \text{"No Good"})$

ShearCheck = "Okay"

BEARING PRESSURE CAUSED BY FOOTING

$$A_{mat} := W_f^2$$

$A_{mat} = 784\,\text{ft}^2$

$$S := \frac{W_f^3}{6}$$

$S = 3658.6667\,\text{ft}^3$

$$P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$$

$P_{max} = 2.1881\,\text{ksf}$

$$P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$$

$P_{min} = -0.1084\,\text{ksf}$

$\text{MaxPressure} := \text{if}(P_{max} < q_s, \text{"Okay"}, \text{"No Good"})$

MaxPressure = "Okay"

$\text{MinPressure} := \text{if}[(P_{min} \geq 0) \cdot (P_{min} < q_s), \text{"Okay"}, \text{"No Good"}]$

MinPressure = "No Good"

Distance to Resultant of Pressure Distribution:

$$X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3}$$

$X_p = 8.8929\,\text{ft}$

Distance to Kern:

$$X_k := \frac{W_f}{6}$$

$X_k = 4.6667\,\text{ft}$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$$e := \frac{M_{ot}}{WT_{tot}}$$

$e = 5.153$

Adjusted Soil Pressure:

$$P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)}$$

$P_a = 2.1941\,\text{ksf}$

$$q_{adj} := \text{if}\left(P_{min} < 0, P_a, \frac{P_{max}}{ft^2} \right)$$

$q_{adj} = 2.1941\,\text{ksf}$

$\text{PressureCheck} := \text{if}(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"})$

PressureCheck = "Okay"

CONCRETE BEARING CAPACITY (ACI 10.17)

$\phi_c := 0.75$ (ACI 9.3.2.2)

$P_b := \phi_c \cdot 0.85 \cdot f'c \cdot \frac{d_p^2 \cdot \pi}{4}$ $P_b = 14131.5121\,kip$

$BearingCheck := if(P_b > LF \cdot C_t, "Okay", "No Good")$ BearingCheck = "Okay"

SHEAR STRENGTH OF CONCRETE

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_{va} := .85$ (ACI 9.3.2.3)

$d := T_f - Cvr_{pad} - d_{bbot}$ $d = 31.59\,in$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$ $d_1 = 10.5\,ft$

$d_2 := d_1 - d$ $d_2 = 7.8675\,ft$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$ $L = 26.541\,ft$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$ $Slope = 0.0827\,kcf$

$V_{req} := LF \cdot \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$ $V_{req} = 672.6935\,kip$

ACI 11.3.1.1 $V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f'c \cdot psi} \cdot W_f \cdot d$ $V_{Avail} = 1141.2159\,kip$

$BeamShearCheck := if(V_{req} < V_{Avail}, "Okay", "No Good")$ BeamShearCheck = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.12.2.1)

$b_o := (d_p + d) \cdot \pi$ $b_o = 30.2614\,ft$

Area included inside bo: $A_{bo} := \frac{\pi \cdot (d_p + d)^2}{4}$ $A_{bo} = 72.8732\,ft^2$

Area outside of bo: $A_{out} := A_{mat} - A_{bo}$ $A_{out} = 711.1268\,ft^2$

Guess Value: $v_u := 1\,ksf$

(From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{WT_{tot}}{\pi \cdot v_u}$

$v_u := \text{Find}(v_u)$ $v_u = 10.2338\,ksf$

$V_u := v_u \cdot d \cdot W_f$ $V_u = 754.3339\,kips$

$V_{req} := LF \cdot V_u$ $V_{req} = 980.6341\,kips$

$V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f'c \cdot psi} \cdot b_o \cdot d$ $V_{Avail} = 2466.7701\,kips$

$PunchingShearCheck := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$ PunchingShearCheck = "Okay"

STEEL REINFORCEMENT IN THE PAD $\phi_m := .90$ ACI 9.3.2.2

Take Maximum Bending at face of Pier:

$q_b := q_{adj} - d_1 \cdot Slope$ $q_b = 1.3261\,ksf$

$M_n := \frac{LF}{\phi_m} \cdot \left[(q_{adj} - q_b) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f$ $M_n = 4246.5795\,kip \cdot ft$

ACI 10.2.7.3 $\beta := \text{if}\left[f'c \le 4000 \cdot psi, .85, \text{if}\left[f'c \ge 8000 \cdot psi, .65, .85 - \left(\frac{\frac{f'c}{psi} - 4000}{1000} \right) \cdot .05 \right] \right]$ $\beta = 0.85$

$R_u := \frac{M_n}{\phi_m \cdot W_f \cdot d^2}$ $R_u = 24316.5\,lbf$

$\rho := \frac{0.85 \cdot f'c}{fy} \left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f'c}} \right)$ $\rho = 0.0029$

$\rho_{min} := 1.333 \cdot \rho$ $\rho_{min} = 0.00385$

Temperature and Shrinkage: $\rho_{sh} := if(fy \geq 60000 \cdot psi, 0.0018, 0.0020)$ $\rho_{sh} = 0.0018$

(ACI 7.12.2.1b)

FOR BOTTOM BARS: $As := \max(\rho, \rho_{min}, \rho_{sh}) \cdot W_f \cdot d$ $As = 40.8618\ in^2$

$As_{prov} := A_{bot} \cdot NB_{bot}$ $As_{prov} = 78\ in^2$

$PadReinforcement := if(As_{prov} > As, "Okay", "No Good")$ PadReinforcement = "Okay"

FOR TOP BARS: $As := \rho_{sh} \cdot (W_f \cdot d)$ $As = 19.1056\ in^2$

$As_{prov} := A_{btop} \cdot NB_{top}$ $As_{prov} = 39\ in^2$

$PadReinforcement := if(As_{prov} > As, "Okay", "No Good")$ PadReinforcement = "Okay"

TENSION (ACI 12.2.3) **DEVELOPMENT LENGTH OF PAD REINFORCEMENT**

Bar Spacing: $B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1}$ $B_{sPad} = 5.2959\ in$

Development Length Factors:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right)$ $c = 2.648\ in$

Transverse Reinforcement Index: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40} \cdot \frac{fy}{\sqrt{f'c \cdot psi}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{\frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot}$$

$L_{dbt} = 53.4207\ in$

$L_{dbmin} := 12 \cdot in$

Minimum Development Length: (ACI 12.2.1) $L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin")$ $L_{dbtCheck} = "Use\ L.dbt"$

Available Length in Pad: $L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad}$ $L_{Pad} = 123\ in$

$LpadTension := if(L_{Pad} > L_{dbt}, "Okay", "No Good")$ LpadTension = "Okay"

REINFORCEMENT IN PIER

Pier Area: $A_{pv} := \frac{\pi \cdot d_p^{\,2}}{4}$ $A_p = 5541.7694\,in^2$

(ACI 10.8.4 and 10.9.1) $A_{smin} := 0.01 \cdot 0.05 \cdot A_p$ $A_{smin} = 2.7709\,in^2$

$A_{sprov} := NBpier \cdot A_{bpier}$ $A_{sprov} = 44\,in^2$

$SteelAreaCheck := if\left(A_{sprov} > A_{smin}, "Okay", "No\ Good"\right)$ $SteelAreaCheck = "Okay"$

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier: $B_{sPier} := \frac{d_p \cdot \pi}{NBpier} - d_{bpier}$ $B_{sPier} = 4.8696\,in$

Diamter of Reinforcement Cage: $Diam_{cage} := d_p - 2 \cdot Cvr_{pier}$ $Diam_{cage} = 78\,in$

Maximum Moment in Pier: $M_p := \left[M_t + S_t \cdot \left(L_p + \frac{A_{BP}}{4}\right)\right] \cdot LF$ $M_p = 64077\,in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

(defined variables) $\left(f'_c \;\; f_y \;\; cl \;\; Spiral\right) = (4 \;\; 60 \;\; 3 \;\; 0)$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches: $\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) := (84 \;\; 44 \;\; 9 \;\; 53 \;\; 64077)$

Clears any previous output: $\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := (0 \;\; 0 \;\; 0 \;\; 0)$

$\left(\phi P_{nv} \;\; \phi M_{xnv} \;\; f_{spv} \;\; \rho_v\right) := \phi P'_n\left(D, N, n, P_u, M_{xu}\right)^T$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio: $\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) = (70.1694 \;\; 84834.7686 \;\; -60 \;\; 0.0079)$

Column size and reinforcement may be changed to match capacity to the applied load.

$AxialLoadCheck := if\left(\phi P_n \geq P_u, "Okay", "No\ Good"\right)$ $AxialLoadCheck = "Okay"$

$BendingCheck := if\left(\phi M_{xn} \geq M_{xu}, "Okay", "No\ Good"\right)$ $BendingCheck = "Okay"$

DEVELOPMENT LENGTH OF PIER REINFORCEMENT

TENSION (ACI 12.2.3)

Factors for development:

Reinforcement Location Factor $\alpha := 1.0$

Coating Factor $\beta := 1.0$

Concrete strength Factor $\lambda := 1.0$

Reinforcement Size Factor $\gamma := 1.0$

Spacing or Cover Dimension: $c := \text{if}\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right)$ $c = 2.4348\,in$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40}\cdot\frac{fy}{\sqrt{f'c\cdot psi}}\cdot\frac{\alpha\cdot\beta\cdot\gamma\cdot\lambda}{\frac{c+k_{tr}}{d_{bpier}}}\cdot d_{bpier} \qquad L_{dbt} = 37.1825\,in$$

Minimum Development Length: (ACI 12.2.1) $L_{dbmin} := 12\cdot in$

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$$L_{dh} := \frac{1200\cdot d_{bpier}}{\sqrt{\frac{f'c}{psi}}}\cdot .7 \qquad L_{dh} = 14.9816\,in$$

$$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right) \qquad L_{db} = 37.1825\,in$$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02\cdot d_{bpier}\cdot fy}{\sqrt{f'c\cdot psi}} \qquad L_{dbc1} = 21.4023\,in$$

$$L_{dbmin} := 0.0003\cdot\frac{in^2}{lb}\cdot\left(d_{bpier}\cdot fy\right) \qquad L_{dbmin} = 20.304\,in$$

$$L_{dbc} := \text{if}\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) \qquad L_{dbc} = 21.4023\,in$$

Available Length in Pier: $L_{pier} := L_p - 3\cdot in$ $L_{pier} = 63\,in$

$L_{piertension} := \text{if}\left(L_{pier} > L_{dbt}, \text{"Okay"}, \text{"No Good"}\right)$ $L_{piertension} = \text{"Okay"}$

$L_{piercompression} := \text{if}\left(L_{pier} > L_{dbc}, \text{"Okay"}, \text{"No Good"}\right)$

NOTE: Anchor bolts and plate provided, OK

Available Length in Pad: $L_{pad} := T_f - 3\cdot in$ $L_{pad} = 33\,in$

$L_{padtension} := \text{if}\left(L_{pad} > L_{dh}, \text{"Okay"}, \text{"No Good"}\right)$ $L_{padtension} = \text{"Okay"}$

$L_{padcompression} := \text{if}\left(L_{pad} > L_{dbc}, \text{"Okay"}, \text{"No Good"}\right)$

TIE SIZE AND SPACING IN COLUMN

Minimum Tie Size:

$Tie_{min} := if(BSpier \le 10, 3, 4)$ $\quad Tie_{min} = 3$

Used #4 Ties $\quad d_{Tie} := 4$

Seismic factor:
(ACI 21.10.5)

$z := if(Z \le 2, 1, 0.5)$ $\quad z = 1$

$s_{lim1} := 16 \cdot d_{bpier} \cdot z$ $\quad s_{lim1} = 18.048\,in$

$s_{lim2} := \frac{48 \cdot d_{Tie} \cdot in}{8} \cdot z$ $\quad s_{lim2} = 24\,in$

$s_{lim3} := D_f \cdot z$ $\quad s_{lim3} = 90\,in$

$s_{lim4} := 18in$ $\quad s_{lim4} = 18\,in$

Maximum Spacing:

$$s_{tie} := \min\left(\begin{pmatrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{pmatrix}\right)$$ $\quad s_{tie} = 18\,in$

Number of Ties Required:

$$n_{tie} := \frac{L_{pier} - 3 \cdot in}{s_{tie}} + 1$$ $\quad n_{tie} = 4.3333$

Site 1


Site 1

Site Specific Attachments

Site 2

1. Site Plans
2. Tower Structural Analysis
3. Site Photographs

APPROVALS

NAME (PRINT)	SIGNATURE	DATE
CINGULAR		
NAME (PRINT)	SIGNATURE	DATE
SAI		
NAME (PRINT)	SIGNATURE	DATE
SITING COUNCIL COMMITTEE		
NAME (PRINT)	SIGNATURE	DATE
OTHER		

SITE NUMBER: 2142
SITE NAME: WILTON NORTH

DRAWING INDEX

		REV
2142 - T1	TITLE SHEET	2
2142 - C1	SITE PLAN	2
2142 - C2	SITE ELEVATION & ANTENNA PLAN	2
2142 - C3	ANTENNA PLUMBING DIAGRAM-ALPHA-BETA-GAMMA	2
2142 - C4	RF DATA INFORMATION	2

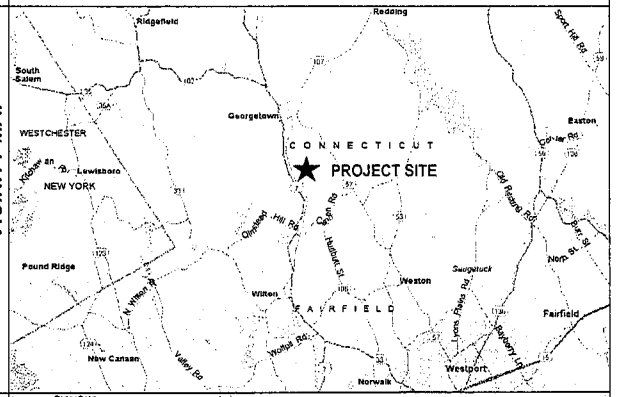
PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE NUMBER:	2142
SITE NAME:	WILTON NORTH
ADDRESS:	128 MATHERS ST
CITY, STATE ZIP	WILTON, CT 06897
LATITUDE:	41° 14' 18.34"
LONGITUDE:	-73° 25' 26.44"
JURISDICTION:	FAIRFIELD COUNTY
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
SITE TYPE:	SELF SUPPORT TOWER
RAD CENTER:	150'-0"
OWNER:	CROWN CASTLE BU# 806353

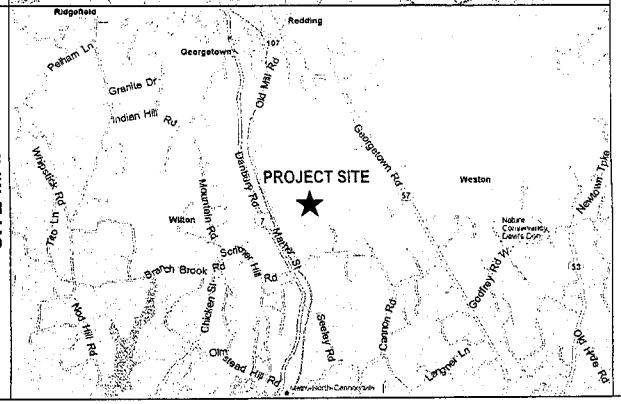
MAPS & DIRECTIONS

95 SOUTH TO EXIT 15 (RT 7). TAKE RT NORTH TO A RIGHT ONTO HONEY HILL RD. (APPRX. 7 MILES) TO A LEFT ONTO MATHER RD. (100 YDS). SITE IS INSIDE TOWN DUMP ON RIGHT.

VICINITY MAP



SITE MAP



BLDG. CODES AND STANDARDS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
INTERNATIONAL BUILDING CODE (IBC), 2003

ELECTRICAL CODE:
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70 - 2002 NATIONAL ELECTRICAL CODE

LIGHTNING PROTECTION CODE:
NFPA 780 - 2000, LIGHTNING PROTECTION CODE

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS.
AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1275, GENERAL INSTALLATION REQUIREMENTS

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.
245 COMMERCE GREEN BLVD. SUITE 240
SUGARLAND, TX 77478
PHONE: 281-343-7090
FAX: 281-343-7727

SITE NUMBER:
2142
SITE NAME:
WILTON NORTH
SITE ADDRESS:
128 MATHERS STREET
WILTON, CT 06897

DRAWN BY:	JR
CHECKED BY:	OP
PROJECT NO:	0504A108-8995180

SUBMITTALS

NO	DESCRIPTION	BY	DATE
1	SITING COMMITTEE CDS	JR	07/15/05
2	REV ANT EL FROM 136' TO 150' PER OWNER	JR	07/27/05

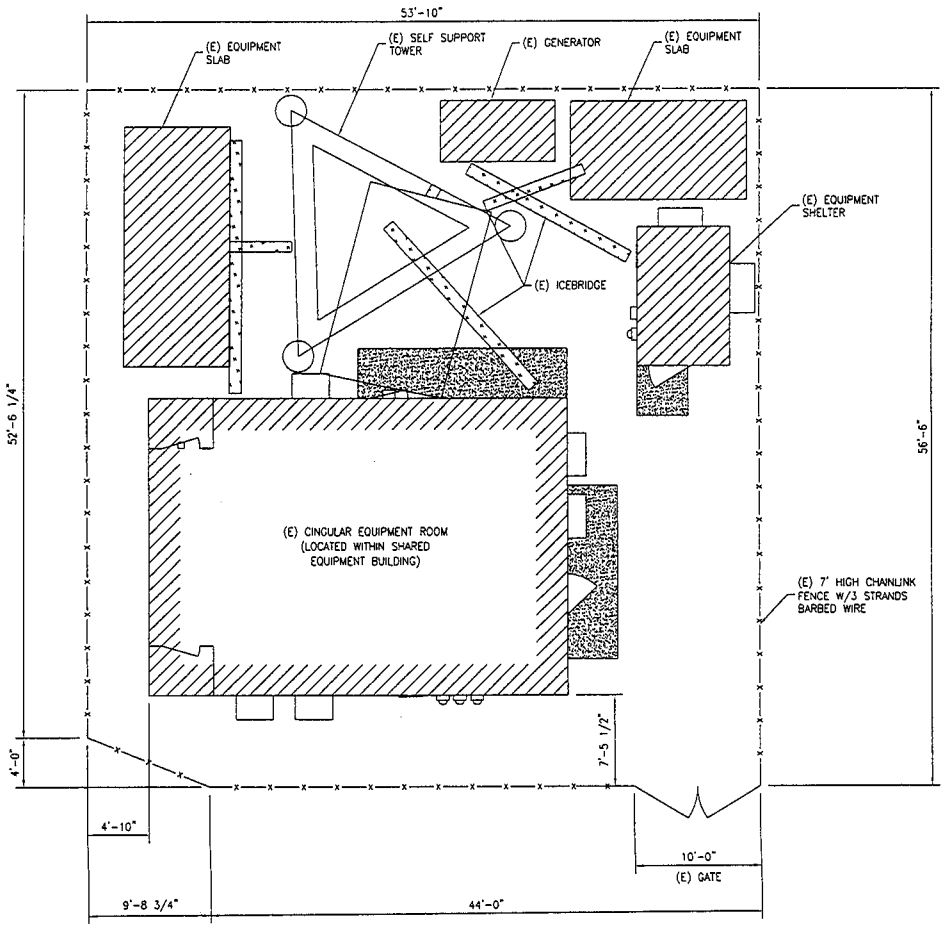
STATE OF CONNECTICUT
OSCAR PEDRAZA
No. 21292
LICENSED PROFESSIONAL ENGINEER
07/27/05

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T1

File Info: C:\Cingular\2142\2142 Civil Set.dwg Aug 05, 2005 - 9:41am Jross

PURPOSE OF THESE DESIGN DOCUMENTS ARE FOR 6 ANTENNA REPLACEMENTS, 3 ANTENNA REMOVALS, 9 EXISTING 7/8" COAXIAL REMOVALS TO BE REPLACED WITH 12 PROPOSED 1 5/8" COAXIAL CABLES FOR CINGULAR WIRELESS.



SITE PLAN

1 / C1

SCALE: 11x17 - 1"=10'-0"
SCALE: 22x34 - 1"=5'-0"

File Info: C:\Cingular\2142\2142 Civil Set.dwg Aug 05, 2005 - 9:41am Jross

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.
345 COMMERCE GREEN BLVD. SUITE 240
SUGARLAND, TX 77478
PHONE: 281-242-7099
FAX: 281-242-7127

SITE NUMBER:
2142
SITE NAME:
WILTON NORTH
SITE ADDRESS:
128 MATHERS STREET
WILTON, CT 06897

DRAWN BY:	JR
CHECKED BY:	GP
PROJECT NO:	05041108-8995160

SUBMITTALS

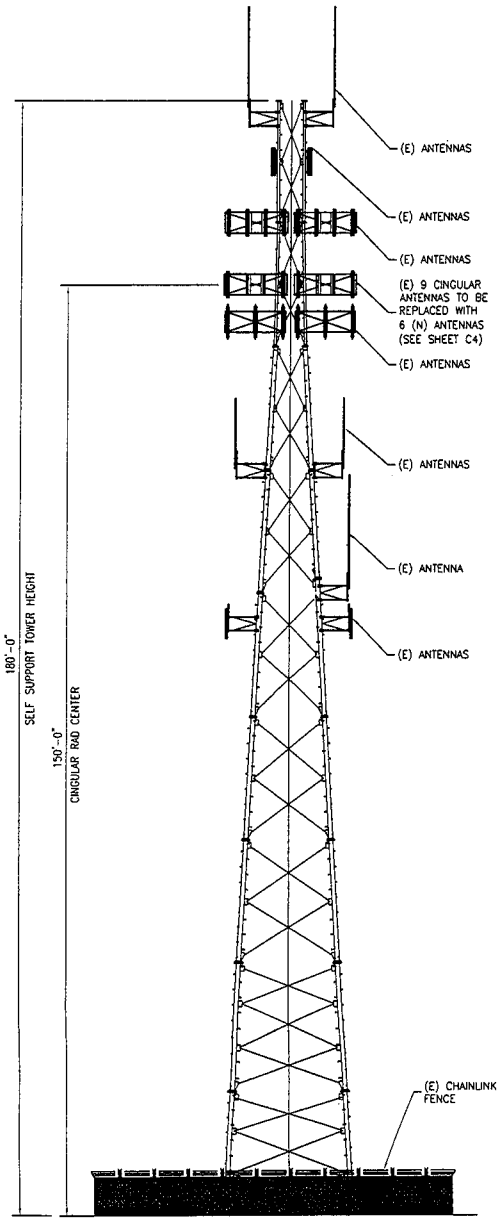
NO	DESCRIPTION	BY	DATE
1	SITING COMMITTEE CDS	JR	07/15/05
2	REV ANT EL FROM 136' TO 130' PER OWNER	JR	07/27/05

STATE OF CONNECTICUT
OSCAR PEDRAZA
No. 21292
LICENSED PROFESSIONAL ENGINEER
07/27/05

SHEET TITLE
SITE PLAN

SHEET NUMBER
C1

CONSTRUCTION SHALL NOT PROCEED UNTIL A STRUCTURAL ANALYSIS HAS BEEN PERFORMED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN CT TO DETERMINE IF THE TOWER IS STRUCTURALLY ADEQUATE TO SUSTAIN PROPOSAL.

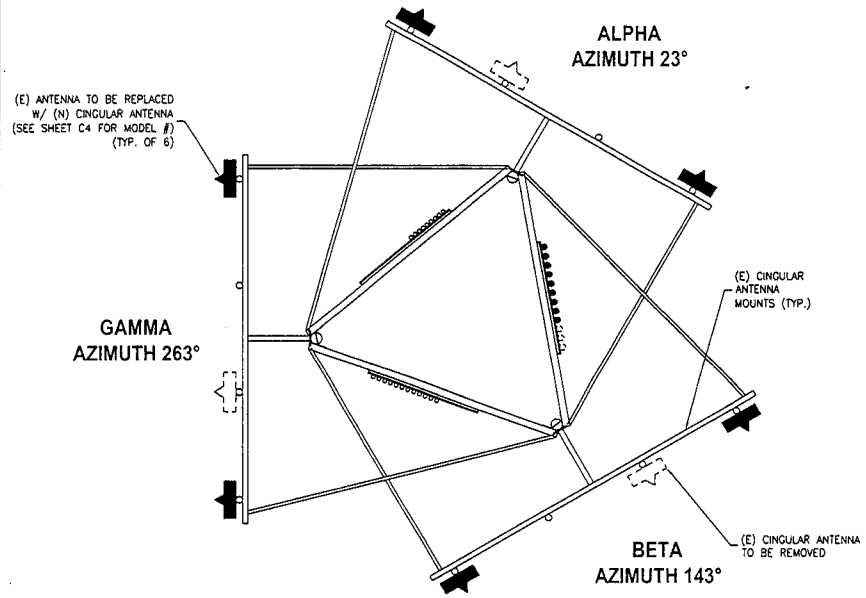


SITE ELEVATION

SCALE: 11x17 - 1"=20'-0"
SCALE: 22x34 - 1"=10'-0"

1 / C2

PURPOSE OF THESE DESIGN DOCUMENTS ARE FOR 6 ANTENNA REPLACEMENTS, 3 ANTENNA REMOVALS, 9 EXISTING 7/8" COAXIAL REMOVALS TO BE REPLACED WITH 12 PROPOSED 1 5/8" COAXIAL CABLES FOR CINGULAR WIRELESS.



ANTENNA PLAN VIEW

SCALE: 11x17 - NTS
SCALE: 22x34 - NTS

2 / C2

N

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.
245 COMMERCE GREEN BLVD. SUITE 240
SUGARLAND, TX 77478
PHONE: 281-343-7099
FAX: 281-343-7127

SITE NUMBER:
2142
SITE NAME:
WILTON NORTH
SITE ADDRESS:
128 MATHERS STREET
WILTON, CT 06897

DRAWN BY: JR
CHECKED BY: OP
PROJECT NO: 0504A108-8995180

SUBMITTALS

NO	DESCRIPTION	BY	DATE
1	SITING COMMITTEE CDS	JR	07/15/05
2	REV. ANT EL. FROM 136' TO 150' PER OWNER	JR	07/27/05

STATE OF CONNECTICUT
OSCAR PEDRAZA
No. 21292
LICENSED PROFESSIONAL ENGINEER

07/27/05

SHEET TITLE
SITE ELEVATION & ANT PLAN

SHEET NUMBER
C2

File Info: C:\Cingular\2142\2142 Civil Set.dwg Aug 05, 2005 - 9:51am Jross

December 9, 2005

Steve Tuttle
Crown Castle International
349 West Commercial St., Suite 2630
East Rochester, NY 14445
(585) 899-3445

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
kmeehan@verticalstructures.com

Subject: Structural Analysis Report

Carrier Designation	**Cingular Change-Out** **Carrier Site Number: 2142** **Carrier Site Name: Wilton - North**
Crown Castle Designation	**Crown Castle BU Number: 806353** **Crown Castle Site Name: BRG 124** **Crown Castle JDE Job Number: 64044**
Engineering Firm Designation	**Vertical Structures Project Number: 2005-004-092**
Site Data	**Mather Street to Honey Hill Trail, Wilton, CT, Fairfield County** **Latitude 41°-14'-18.34", Longitude -73°-25'-26.44".** **180' FWT Self-Supporting Tower**

Dear Mr. Tuttle,

Vertical Structures is pleased to submit this structural analysis report to determine the structural integrity of the aforementioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Numbers 196740 and 197260. The purpose of the analysis is to determine the suitability of the tower upon replacing nine (9) existing panel antennas mounted on three (3) existing sector frames at 150' with six (6) proposed Powerwave Technologies 7770.00 panel antennas, six (6) proposed Powerwave Technologies LGP2140X tower mounted amplifiers, and six (6) proposed Powerwave Technologies LGP13519 diplexers for Cingular when combined with the existing and reserved equipment on the structure. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a 85 MPH basic "fastest mile" wind speed, equivalent to an 105 MPH basic "3-second gust" wind speed per IBC Table 1609.3.1.

Based on our analysis we have determined the tower superstructure and foundation are sufficient for the proposed loading, provided the modifications in Appendix C are completed.

Vertical Structures appreciates the opportunity of providing our continuing professional services to you and Crown Castle International. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted,

Kyle Meehan
Project Engineer

TABLE OF CONTENTS

INTRODUCTION

The 180' tall self-supporting tower was designed by P.J. Ford and Company and manufactured by FWT in 1988 for Metro-Mobile. The three (3) sided tower is constructed of pipe legs with angle x-bracing and is founded on three (3) 2'-6" diameter by 9'-6" deep drilled piers. The tower was reworked in 2005 to accommodate additional loading.

ANALYSIS CRITERIA

The BRG 124 tower was analyzed in accordance with the current EIA-222-F publication, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures." The proposed, existing and reserved antennas, cables and mounts considered in this analysis are listed in Tables 1 and 2. Applied forces in this study were derived from an 85 MPH basic "fastest mile" wind speed with no ice and a reduced 74 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The tower was originally designed for an 85 MPH basic "fastest mile" wind speed with no ice and a reduced 74 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The original design loads are listed in Table 3. All cables are assumed to be routed in accordance with the drawings in Appendix B.

Table 1 – Proposed Antenna and Cable Information

Center Line Elevation (feet)	Carrier Name	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
150	Cingular	6	Powerwave Technologies	7770.00			12	1 5/8
		6	Powerwave Technologies	LGP2140X TMA				
		6	Powerwave Technologies	LGP13519 Diplexer				

Table 2 – Existing and Reserved Antenna and Cable Information

Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
178	12	Decibel	DB844H90E-XY		(3) 12' T-Frames	12	1 1/4
172	3	EMS Wireless	RR90-17-00DP		Leg Mounted	6	1 5/8
162	6	Decibel	DB948F65T2E-M		(3) 12' Angle Sector Frames	6	1 1/4
	6	Swedcom	ALP 11011-N			6	1 5/8
150*	9		Panel		(3) 12'-6" Angle Sector Frames	9	7/8
144	6 + 3**	Decibel	DB980H90E-M		(3) 12' Knockdown T-Frames	6 + 3**	1 5/8
124	2	Decibel	DB809K-Y		(2) 6' Sidearms	2	7/8
104	1	Decibel	DB810M-XC		(2) 6' Sidearms	2	3/8
	1	Decibel	DB809K-Y				
95	3 + 9**	EMS Wireless	DR85-17-02DPL2Q		(3**) 12' T-Frames	24**	1 5/8
65					(1) 4' Sidearm		
42					(1) 4' Sidearm		

*Indicates antennas and cables to be removed. Existing mounts to be reused.
**Indicates reserved loading.

Table 3 – Design Antenna and Cable Information

Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
180	2	Celwave	PD10017			2	7/8
165	3	Celwave	PD1132D			3	7/8
160	2		8' Std. Dish			2	7/8
140	2	Celwave	PD10017			2	7/8
125	3	Celwave	PD1132D			3	7/8

ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Reference	Source
Online Application	Cingular Change-Out Revision # 0	23334	CCI iSite
Tower Drawing	P.J. Ford and Company Commission No. 18888-81	217757	CCI iSite
Foundation Drawing	P.J. Ford and Company Commission No. 18888-99	262285	CCI iSite
Geotechnical Report	Greiner Job No. F043118	262283	CCI iSite
Rework Drawings	All-Points Technology Job No. CT105271	801524	CCI iSite

Analysis Methods

ERI Tower (Version 3.0), a commercially available software program, was used to create a three-dimensional model of the tower and calculate member stresses for various dead, live, wind, and ice load cases. All loads were computed in accordance with the ANSI/EIA/TIA-222-F or the local building code requirements. Selected output from the analysis is included in Appendix A.

Assumptions

1. Tower and structures were built in accordance with the manufacturer's specifications.
2. The tower and structures have been maintained in accordance with manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and any referenced drawings.
4. When applicable, transmission cables are considered to be structural components for calculating wind loads, as allowed by TIA/EIA-222-F.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and Vertical Structures should be allowed to review any new information to determine its effect on the structural integrity of the tower.

ANALYSIS RESULTS

Table 5A – Tower Component Stresses vs. Capacity

Section Number	Elevation (feet)	Combined Stress Ratio	Allowable Stress Ratio	Percent Capacity Used
1	180 – 160	1.730	1.333	129.8
2	160 – 140	2.055	1.333	154.2
3	140 – 120	2.053	1.333	154.0
4	120 – 100	2.193	1.333	164.5
5	100 – 80	1.893	1.333	142.0
6	80 – 60	1.893	1.333	142.0
7	60 – 40	1.992	1.333	149.4
8	40 – 20	2.258	1.333	169.4
9	20 – 0	1.873	1.333	140.5
Anchor Bolts – Tension				110.3
Foundation – Uplift (comparing actual loads to allowable loads)				> 100.0

Required Modifications

Results indicate that the tower superstructure and foundation are insufficient to accommodate the proposed loading. Modifications (A) through (E) are required to remedy the deficiencies identified in Table 5A. The required modification drawings are provided in Appendix C. If requested, Vertical Structures will supply the material necessary to make the required modifications.

(A) Reinforce the legs between 164' and 0'.

(B) Reinforce the diagonals between 106' and 100'.

(C) Reinforce the diagonals between 93' and 0'.

(D) Reinforce the anchor bolts.

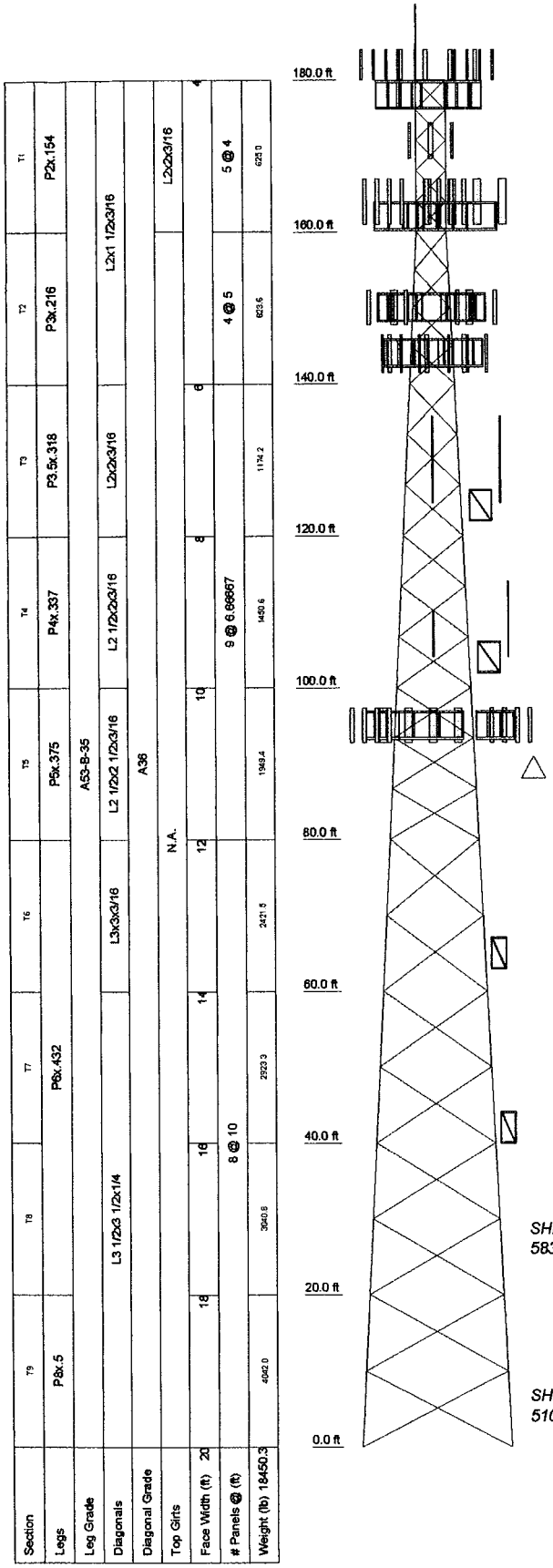
(E) Reinforce the foundation.

Table 5B – Tower Component Stresses vs. Modified Capacity

Section Number	Elevation (feet)	Combined Stress Ratio	Allowable Stress Ratio	Percent Capacity Used
1 – 5	180 – 160	0.790	1.333	86.3
6	160 – 140	1.109	1.333	83.2
7	140 – 120	1.330	1.333	99.8
8 – 10	120 – 100	1.337	1.333	100.3*
11 – 13	100 – 80	1.318	1.333	98.9
14	80 – 60	1.316	1.333	98.7
15	60 – 40	1.236	1.333	92.7
16 – 17	40 – 20	1.258	1.333	94.4
18	20 – 0	1.253	1.333	94.0
Anchor Bolts – Tension				84.8
Foundation – Uplift (comparing actual loads to allowable loads)				< 100.0

*Indicates an overstress of less than 5% and is considered acceptable based on the analysis procedure used.

APPENDIX A



MAX PIER FORCES:
DOWN: 378447 lb
UPLIFT: -290094 lb
SHEAR: 37252 lb

AXIAL
78624 lb
SHEAR
58352 lb
MOMENT
6100959 lb-ft
TORQUE 42547 lb-ft
74 mph WIND - 0.5000 in ICE

AXIAL
44736 lb
SHEAR
51069 lb
MOMENT
5383168 lb-ft
TORQUE 35429 lb-ft
REACTIONS - 85 mph WIND

APPURTENANCES

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x10'	180	(2) LGP2140X (Cingular)	150
12' T-Frame Mount (1) (VSI)	178	(2) LGP2140X (Cingular)	150
12' T-Frame Mount (1) (VSI)	178	(2) LGP2140X (Cingular)	150
12' T-Frame Mount (1) (VSI)	178	(2) LGP13519 Diplexer (Cingular)	150
(4) DB844H90E-XY w/Mount Pipe	178	(2) LGP13519 Diplexer (Cingular)	150
(4) DB844H90E-XY w/Mount Pipe	178	(2) LGP13519 Diplexer (Cingular)	150
(4) DB844H90E-XY w/Mount Pipe	178	(2) 4'x2" Antenna Mount Pipe	150
Face Mount	172	(2) 4'x2" Antenna Mount Pipe	150
Face Mount	172	(2) 4'x2" Antenna Mount Pipe	150
Face Mount	172	12' Knockdown T-Frame (1) (VSI)	144
RR90-17-00DP w/Mount Pipe	172	12' Knockdown T-Frame (1) (VSI)	144
RR90-17-00DP w/Mount Pipe	172	12' Knockdown T-Frame (1) (VSI)	144
RR90-17-00DP w/Mount Pipe	172	(3) DB980H90E-M w/Mount Pipe	144
12' Angle Sector Frame Mount (1) (VSI)	162	(3) DB980H90E-M w/Mount Pipe	144
		(3) DB980H90E-M w/Mount Pipe	144
12' Angle Sector Frame Mount (1) (VSI)	162	6' Sidearm (Pipe) (VSI)	124
		6' Sidearm (Pipe) (VSI)	124
12' Angle Sector Frame Mount (1) (VSI)	162	DB809K-Y	124
		DB809K-Y	124
(2) DB948F65T2E-M w/Mount Pipe	162	6' Sidearm (Pipe) (VSI)	104
(2) DB948F65T2E-M w/Mount Pipe	162	6' Sidearm (Pipe) (VSI)	104
(2) DB948F65T2E-M w/Mount Pipe	162	DB810M-XC	104
(2) ALP 11011-N w/Mount Pipe	162	DB809K-Y	104
(2) ALP 11011-N w/Mount Pipe	162	Pirod 12' T-Frame Sector Mount (1) (VSI)	95
(2) ALP 11011-N w/Mount Pipe	162		
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	150	Pirod 12' T-Frame Sector Mount (1) (VSI)	95
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	150	Pirod 12' T-Frame Sector Mount (1) (VSI)	95
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	150	(4) DR85-17-02DPL2Q w/Mount Pipe	95
		(4) DR85-17-02DPL2Q w/Mount Pipe	95
(2) 7770.00 w/ mount pipe (Cingular)	150	(4) DR85-17-02DPL2Q w/Mount Pipe	95
(2) 7770.00 w/ mount pipe (Cingular)	150	4' Side Arm	65
(2) 7770.00 w/ mount pipe (Cingular)	150	4' Side Arm	42

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 169.4%

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job: BRG 124, CT BU#806353			
Project: Vertical Structures Job No. 2005-004-092			
Client: Crown Castle	Drawn by: Kyle Meehan	App'd:	
Code: TIA/EIA-222-F	Date: 12/09/05	Scale: NTS	
Path:		Dwg No. E-1	

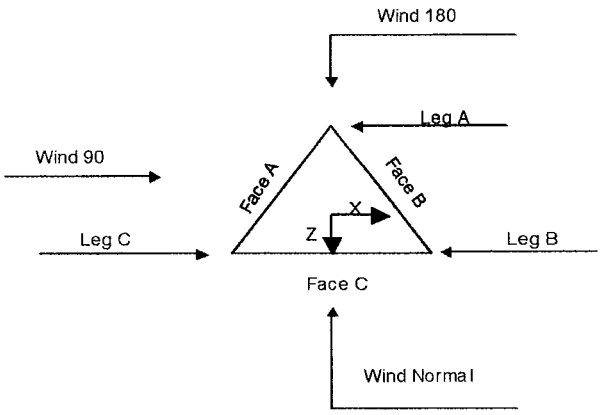
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ **Calculate Redundant Bracing Forces**
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ **Use Code Stress Ratios**	**Use Clear Spans For KL/r**	√ **SR Leg Bolts Resist Compression**
√ **Use Code Safety Factors - Guys**	**Retension Guys To Initial Tension**	√ **All Leg Panels Have Same Allowable**
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ **Consider Feedline Torque**
Use Special Wind Profile	√ Project Wind Area of Appurt.	√ **Include Angle Block Shear Check**
√ **Include Bolts In Member Capacity**	√ Autocalc Torque Arm Areas	**Poles**
Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ **Secondary Horizontal Braces Leg**	**Sort Capacity Reports By Component**	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			4.00	1	20.00
T2	160.00-140.00			4.00	1	20.00
T3	140.00-120.00			6.00	1	20.00
T4	120.00-100.00			8.00	1	20.00
T5	100.00-80.00			10.00	1	20.00
T6	80.00-60.00			12.00	1	20.00
T7	60.00-40.00			14.00	1	20.00
T8	40.00-20.00			16.00	1	20.00
T9	20.00-0.00			18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T2	160.00-140.00	5.00	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000
T5	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T6	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T8	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T9	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T2 160.00-140.00	Pipe	P3x.216	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T3 140.00-120.00	Pipe	P3.5x.318	A53-B-35 (35 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T4 120.00-100.00	Pipe	P4x.337	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 100.00-80.00	Pipe	P5x.375	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 80.00-60.00	Pipe	P6x.432	A53-B-35 (35 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T7 60.00-40.00	Pipe	P6x.432	A53-B-35 (35 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T8 40.00-20.00	Pipe	P6x.432	A53-B-35 (35 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T9 20.00-0.00	Pipe	P8x.5	A53-B-35 (35 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-160.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-160.00	4.50	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T2 160.00-140.00	3.50	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T3 140.00-120.00	2.50	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T4 120.00-100.00	2.50	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T5 100.00-80.00	2.50	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T6 80.00-60.00	1.50	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T7 60.00-40.00	1.50	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T8 40.00-20.00	1.50	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T9 20.00-0.00	1.50	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft															
T1 180.00-160.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 160.00-140.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 140.00-120.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 120.00-100.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 100.00-80.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 80.00-60.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 60.00-40.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 40.00-20.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 20.00-0.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 180.00-160.00	4.5000	4.1875	4.5000	4.1875	0.0000	0.0000	0.0000	0.0000
T2 160.00-140.00	4.6000	4.7500	4.6000	4.7500	0.0000	0.0000	0.0000	0.0000
T3 140.00-120.00	4.5000	5.0000	4.0000	5.0000	0.0000	0.0000	0.0000	0.0000
T4 120.00-100.00	3.5000	5.2500	3.5000	5.2500	0.0000	0.0000	0.0000	0.0000
T5 100.00-80.00	2.5000	5.7815	2.5000	5.7815	0.0000	0.0000	0.0000	0.0000
T6 80.00-60.00	4.0000	6.3125	4.0000	6.3125	0.0000	0.0000	0.0000	0.0000
T7 60.00-40.00	4.0000	6.3125	4.0000	6.3125	0.0000	0.0000	0.0000	0.0000
T8 40.00-20.00	3.9000	6.3125	3.9000	6.3125	0.0000	0.0000	0.0000	0.0000
T9 20.00-0.00	4.0000	7.3125	4.0000	7.3125	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.6250 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T2 160.00-140.00	Flange	0.6250 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-80.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 80.00-60.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 60.00-40.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 40.00-20.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	0
T9 20.00-0.00	Flange	1.5000 F1554-36	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Climbing Ladder (Af) **	B	No	Af (CfAe)	180.00 - 0.00	1.0000	0	1	1	4.0000	4.0000	14.0000	7.90
Feedline Ladder (Af)	B	Yes	Af (CfAe)	180.00 - 5.00	-0.5000	-0.4	1	1	3.0000	3.0000	12.0000	8.40
LDF6-50A (1-1/4 FOAM) **	B	Yes	Ar (CfAe)	180.00 - 5.00	-1.0000	-0.4	12	12	0.9500	1.5500		0.66
Feedline Ladder (Af)	A	Yes	Af (CfAe)	150.00 - 5.00	-0.5000	0.4	2	1	1.0000	3.0000	12.0000	8.40
Feedline Ladder (Af)	A	Yes	Af (CfAe)	172.00 - 150.00	-0.5000	0.4	1	1	1.0000	3.0000	12.0000	8.40
CR 50 1873 (1-5/8 FOAM) (Cingular)	A	Yes	Ar (CfAe)	150.00 - 5.00	-1.0000	0.4	18	12	1.0000	1.9800		0.83
CR 50 1873 (1-5/8 FOAM)	A	Yes	Ar (CfAe)	172.00 - 150.00	-1.0000	0.4	6	6	1.0000	1.9800		0.83
LDF2-50A (3/8 FOAM) **	A	Yes	Ar (CfAe)	104.00 - 5.00	1.0000	0.3	2	2	1.0000	0.4400		0.08
Feedline Ladder (Af)	C	Yes	Af (CfAe)	160.00 - 5.00	0.5000	0	1	1	3.0000	3.0000	12.0000	8.40
LDF7-50A (1-5/8 FOAM)	C	Yes	Ar (CfAe)	164.00 - 5.00	1.0000	-0.05	6	6	1.0000	1.9800		0.82
LDF6-50A (1-1/4 FOAM)	C	Yes	Ar (CfAe)	164.00 - 5.00	1.0000	0.05	6	6	1.0000	1.5500		0.66
LDF5-50A (7/8 FOAM) **	C	Yes	Ar (CfAe)	124.00 - 5.00	1.0000	0.1	2	2	1.0000	1.0900		0.33
Feedline Ladder (Af)	C	Yes	Af (CfAe)	144.00 - 5.00	0.5000	-0.15	1	1	3.0000	3.0000	12.0000	8.40
LDF7-50A (1-	C	Yes	Ar (CfAe)	144.00 - 5.00	1.0000	-0.15	9	5	1.0000	1.9800		0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
5/8 FOAM) **												
Feedline Ladder (Af)	A	Yes	Af (CfAe)	95.00 - 5.00	0.5000	0	1	1	3.0000	3.0000	12.0000	8.40
LDF7-50A (1-5/8 FOAM)	A	Yes	Ar (CfAe)	95.00 - 5.00	1.0000	0.05	24	12	1.0000	1.9800		0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-160.00	A	11.880	3.000	0.000	0.000	160.56
		B	31.000	11.667	0.000	0.000	484.40
		C	7.060	0.000	0.000	0.000	35.52
T2	160.00-140.00	A	29.700	5.000	0.000	0.000	451.20
		B	31.000	11.667	0.000	0.000	484.40
		C	38.600	6.000	0.000	0.000	408.72
T3	140.00-120.00	A	39.600	5.000	0.000	0.000	634.80
		B	31.000	11.667	0.000	0.000	484.40
		C	52.527	10.000	0.000	0.000	663.84
T4	120.00-100.00	A	39.893	5.000	0.000	0.000	635.44
		B	31.000	11.667	0.000	0.000	484.40
		C	55.433	10.000	0.000	0.000	674.40
T5	100.00-80.00	A	70.767	8.750	0.000	0.000	1059.20
		B	31.000	11.667	0.000	0.000	484.40
		C	55.433	10.000	0.000	0.000	674.40
T6	80.00-60.00	A	80.667	10.000	0.000	0.000	1199.60
		B	31.000	11.667	0.000	0.000	484.40
		C	55.433	10.000	0.000	0.000	674.40
T7	60.00-40.00	A	80.667	10.000	0.000	0.000	1199.60
		B	31.000	11.667	0.000	0.000	484.40
		C	55.433	10.000	0.000	0.000	674.40
T8	40.00-20.00	A	80.667	10.000	0.000	0.000	1199.60
		B	31.000	11.667	0.000	0.000	484.40
		C	55.433	10.000	0.000	0.000	674.40
T9	20.00-0.00	A	60.500	7.500	0.000	0.000	899.70
		B	23.250	10.417	0.000	0.000	402.80
		C	41.575	7.500	0.000	0.000	505.80

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-160.00	A	0.500	2.980	18.567	0.000	0.000	346.52
		B		4.250	59.722	0.000	0.000	1009.26
		C		1.843	9.217	0.000	0.000	127.61
T2	160.00-140.00	A	0.500	4.967	45.844	0.000	0.000	993.52
		B		4.250	59.722	0.000	0.000	1009.26
		C		10.210	57.390	0.000	0.000	995.38
T3	140.00-120.00	A	0.500	4.967	60.744	0.000	0.000	1409.51
		B		4.250	59.722	0.000	0.000	1009.26
		C		14.880	78.869	0.000	0.000	1548.48

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T4	120.00-100.00	A	0.500	5.447	61.224	0.000	0.000	1415.43
		B		4.250	59.722	0.000	0.000	1009.26
		C		17.667	81.656	0.000	0.000	1595.96
T5	100.00-80.00	A	0.500	11.092	108.703	0.000	0.000	2690.81
		B		4.250	59.722	0.000	0.000	1009.26
		C		17.667	81.656	0.000	0.000	1595.96
T6	80.00-60.00	A	0.500	12.333	123.889	0.000	0.000	3108.03
		B		4.250	59.722	0.000	0.000	1009.26
		C		17.667	81.656	0.000	0.000	1595.96
T7	60.00-40.00	A	0.500	12.333	123.889	0.000	0.000	3108.03
		B		4.250	59.722	0.000	0.000	1009.26
		C		17.667	81.656	0.000	0.000	1595.96
T8	40.00-20.00	A	0.500	12.333	123.889	0.000	0.000	3108.03
		B		4.250	59.722	0.000	0.000	1009.26
		C		17.667	81.656	0.000	0.000	1595.96
T9	20.00-0.00	A	0.500	9.250	92.917	0.000	0.000	2331.02
		B		3.188	46.736	0.000	0.000	811.89
		C		13.250	61.242	0.000	0.000	1196.97

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.000	0.000	1.878	3.681
		B	0.000	0.000	4.543	9.548
		C	0.000	0.000	0.891	1.861
T2	160.00-140.00	A	0.000	0.000	3.297	6.507
		B	0.000	0.000	3.420	7.189
		C	0.000	0.000	4.238	8.648
T3	140.00-120.00	A	0.000	0.000	3.090	6.122
		B	0.000	0.000	2.494	5.243
		C	0.000	0.000	4.332	8.764
T4	120.00-100.00	A	0.000	0.000	3.498	6.634
		B	0.000	0.000	2.805	5.600
		C	0.000	0.000	5.098	9.911
T5	100.00-80.00	A	0.000	0.000	5.816	11.189
		B	0.000	0.000	2.633	5.258
		C	0.000	0.000	4.786	9.305
T6	80.00-60.00	A	0.000	0.000	5.723	10.595
		B	0.000	0.000	2.272	4.378
		C	0.000	0.000	4.130	7.748
T7	60.00-40.00	A	0.000	0.000	6.359	11.467
		B	0.000	0.000	2.525	4.738
		C	0.000	0.000	4.589	8.386
T8	40.00-20.00	A	0.000	0.000	6.138	11.068
		B	0.000	0.000	2.437	4.573
		C	0.000	0.000	4.430	8.094
T9	20.00-0.00	A	0.000	0.000	4.483	8.084
		B	0.000	0.000	1.780	3.341
		C	0.000	0.000	3.236	5.912

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-160.00	0.9165	-7.7613	0.8180	-7.4228
T2	160.00-140.00	0.7811	-6.1935	0.6510	-6.2638
T3	140.00-120.00	1.6086	-7.3883	1.3204	-7.9198
T4	120.00-100.00	1.7824	-8.5445	1.5088	-9.3967
T5	100.00-80.00	-1.8979	-11.8650	-2.0363	-12.6429
T6	80.00-60.00	-3.2945	-14.2748	-3.4519	-15.2789
T7	60.00-40.00	-3.5541	-15.7858	-3.7602	-17.0403
T8	40.00-20.00	-3.9020	-17.6204	-4.1414	-19.0569
T9	20.00-0.00	-3.0637	-15.7308	-3.4422	-17.5886

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Lightning Rod 1"x10'	C	From Leg	0.00 0.00 5.00	0.0000	180.00	No Ice 1/2" Ice	1.00 2.02	1.00 2.02	40.00 49.26
**									
12' T-Frame Mount (1) (VSI)	A	From Leg	3.00 0.50 0.00	10.0000	178.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
12' T-Frame Mount (1) (VSI)	B	From Leg	3.00 0.50 0.00	10.0000	178.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
12' T-Frame Mount (1) (VSI)	C	From Leg	3.00 0.50 0.00	10.0000	178.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
(4) DB844H90E-XY w/Mount Pipe	A	From Leg	5.00 1.00 4.00	10.0000	178.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	35.55 76.59
(4) DB844H90E-XY w/Mount Pipe	B	From Leg	5.00 1.00 4.00	10.0000	178.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	35.55 76.59
(4) DB844H90E-XY w/Mount Pipe	C	From Leg	5.00 1.00 4.00	10.0000	178.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	35.55 76.59
**									
Face Mount	A	From Face	0.50 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice	2.67 4.00	0.20 0.40	25.52 40.24
Face Mount	B	From Face	0.50 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice	2.67 4.00	0.20 0.40	25.52 40.24
Face Mount	C	From Face	0.50 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice	2.67 4.00	0.20 0.40	25.52 40.24
RR90-17-00DP w/Mount Pipe	A	From Leg	1.00 0.00 0.00	30.0000	172.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 81.64
RR90-17-00DP w/Mount	B	From Leg	1.00	30.0000	172.00	No Ice	4.91	3.64	43.55

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Pipe			0.00 0.00			1/2" Ice	5.57	4.70	81.64
RR90-17-00DP w/Mount Pipe	C	From Leg	1.00 0.00 0.00	30.0000	172.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 81.64
**									
12' Angle Sector Frame Mount (1) (VSI)	A	From Leg	1.50 2.75 0.00	60.0000	162.00	No Ice 1/2" Ice	20.60 28.70	15.00 19.70	465.00 600.00
12' Angle Sector Frame Mount (1) (VSI)	B	From Leg	1.50 2.75 0.00	60.0000	162.00	No Ice 1/2" Ice	20.60 28.70	15.00 19.70	465.00 600.00
12' Angle Sector Frame Mount (1) (VSI)	C	From Leg	1.50 2.75 0.00	60.0000	162.00	No Ice 1/2" Ice	20.60 28.70	15.00 19.70	465.00 600.00
(2) DB948F65T2E-M w/Mount Pipe	A	From Leg	2.50 4.50 2.00	60.0000	162.00	No Ice 1/2" Ice	5.65 6.35	4.96 6.06	39.55 87.28
(2) DB948F65T2E-M w/Mount Pipe	B	From Leg	2.50 4.50 2.00	60.0000	162.00	No Ice 1/2" Ice	5.65 6.35	4.96 6.06	39.55 87.28
(2) DB948F65T2E-M w/Mount Pipe	C	From Leg	2.50 4.50 2.00	60.0000	162.00	No Ice 1/2" Ice	5.65 6.35	4.96 6.06	39.55 87.28
(2) ALP 11011-N w/Mount Pipe	A	From Leg	2.50 4.50 2.00	60.0000	162.00	No Ice 1/2" Ice	3.91 4.53	6.62 7.75	40.95 87.99
(2) ALP 11011-N w/Mount Pipe	B	From Leg	2.50 4.50 2.00	60.0000	162.00	No Ice 1/2" Ice	3.91 4.53	6.62 7.75	40.95 87.99
(2) ALP 11011-N w/Mount Pipe	C	From Leg	2.50 4.50 2.00	60.0000	162.00	No Ice 1/2" Ice	3.91 4.53	6.62 7.75	40.95 87.99
**									
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	A	From Leg	2.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	19.00 27.00	13.50 19.50	445.00 595.00
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	B	From Leg	2.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	19.00 27.00	13.50 19.50	445.00 595.00
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	C	From Leg	2.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	19.00 27.00	13.50 19.50	445.00 595.00
(2) 7770.00 w/ mount pipe (Cingular)	A	From Leg	4.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	56.90 102.99
(2) 7770.00 w/ mount pipe (Cingular)	B	From Leg	4.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	56.90 102.99
(2) 7770.00 w/ mount pipe (Cingular)	C	From Leg	4.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	56.90 102.99
(2) LGP2140X (Cingular)	A	From Leg	4.00 0.00 0.00	3.0000	150.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	17.50 24.46
(2) LGP2140X (Cingular)	B	From Leg	4.00 0.00	3.0000	150.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	17.50 24.46

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00						
(2) LGP2140X	C	From Leg	4.00	3.0000	150.00	No Ice	1.23	0.37	17.50
(Cingular)			0.00			1/2" Ice	1.38	0.48	24.46
			0.00						
(2) LGP13519 Diplexer	A	From Leg	4.00	3.0000	150.00	No Ice	0.27	0.18	5.50
(Cingular)			0.00			1/2" Ice	0.34	0.25	7.92
			0.00						
(2) LGP13519 Diplexer	B	From Leg	4.00	3.0000	150.00	No Ice	0.27	0.18	5.50
(Cingular)			0.00			1/2" Ice	0.34	0.25	7.92
			0.00						
(2) LGP13519 Diplexer	C	From Leg	4.00	3.0000	150.00	No Ice	0.27	0.18	5.50
(Cingular)			0.00			1/2" Ice	0.34	0.25	7.92
			0.00						
(2) 4'x2" Antenna Mount Pipe	A	From Leg	4.00	0.0000	150.00	No Ice	0.87	0.87	13.33
			0.00			1/2" Ice	1.11	1.11	20.65
			0.00						
(2) 4'x2" Antenna Mount Pipe	B	From Leg	4.00	0.0000	150.00	No Ice	0.87	0.87	13.33
			0.00			1/2" Ice	1.11	1.11	20.65
			0.00						
(2) 4'x2" Antenna Mount Pipe	C	From Leg	4.00	0.0000	150.00	No Ice	0.87	0.87	13.33
			0.00			1/2" Ice	1.11	1.11	20.65
			0.00						
**									
12' Knockdown T-Frame (1)	A	From Leg	0.95	-20.0000	144.00	No Ice	8.90	6.00	235.00
(VSI)			-0.35			1/2" Ice	12.60	8.70	340.00
			0.00						
12' Knockdown T-Frame (1)	B	From Leg	0.95	-20.0000	144.00	No Ice	8.90	6.00	235.00
(VSI)			-0.35			1/2" Ice	12.60	8.70	340.00
			0.00						
12' Knockdown T-Frame (1)	C	From Leg	0.95	-20.0000	144.00	No Ice	8.90	6.00	235.00
(VSI)			-0.35			1/2" Ice	12.60	8.70	340.00
			0.00						
(3) DB980H90E-M w/Mount	A	From Leg	1.90	-20.0000	144.00	No Ice	4.27	3.86	34.05
Pipe			-0.70			1/2" Ice	4.86	4.95	69.84
			0.00						
(3) DB980H90E-M w/Mount	B	From Leg	1.90	-20.0000	144.00	No Ice	4.27	3.86	34.05
Pipe			-0.70			1/2" Ice	4.86	4.95	69.84
			0.00						
(3) DB980H90E-M w/Mount	C	From Leg	1.90	-20.0000	144.00	No Ice	4.27	3.86	34.05
Pipe			-0.70			1/2" Ice	4.86	4.95	69.84
			0.00						
**									
6' Sidearm (Pipe) (VSI)	B	From Leg	3.00	0.0000	124.00	No Ice	3.30	5.00	125.00
			0.00			1/2" Ice	4.70	7.10	175.00
			0.00						
6' Sidearm (Pipe) (VSI)	A	From Leg	3.00	0.0000	124.00	No Ice	3.30	5.00	125.00
			0.00			1/2" Ice	4.70	7.10	175.00
			0.00						
DB809K-Y	B	From Leg	6.00	0.0000	124.00	No Ice	2.85	2.85	30.00
			0.00			1/2" Ice	4.03	4.03	51.23
			6.00						
DB809K-Y	A	From Leg	6.00	0.0000	124.00	No Ice	2.85	2.85	30.00
			0.00			1/2" Ice	4.03	4.03	51.23
			6.00						
**									
6' Sidearm (Pipe) (VSI)	B	From Leg	3.00	0.0000	104.00	No Ice	3.30	5.00	125.00
			0.00			1/2" Ice	4.70	7.10	175.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00						
6' Sidearm (Pipe) (VSI)	A	From Leg	3.00 0.00 0.00	0.0000	104.00	No Ice 1/2" Ice	3.30 4.70	5.00 7.10	125.00 175.00
DB810M-XC	B	From Leg	6.00 0.00 5.00	0.0000	104.00	No Ice 1/2" Ice	2.12 3.14	2.12 3.14	30.00 46.22
DB809K-Y	A	From Leg	6.00 0.00 3.00	0.0000	104.00	No Ice 1/2" Ice	2.85 4.03	2.85 4.03	30.00 51.23
**									
Pirod 12' T-Frame Sector Mount (1) (VSI)	A	From Leg	2.75 -1.00 0.00	-20.0000	95.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
Pirod 12' T-Frame Sector Mount (1) (VSI)	B	From Leg	2.75 -1.00 0.00	-20.0000	95.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
Pirod 12' T-Frame Sector Mount (1) (VSI)	C	From Leg	2.75 -1.00 0.00	-20.0000	95.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
(4) DR85-17-02DPL2Q w/Mount Pipe	A	From Leg	4.75 -1.75 0.00	-20.0000	95.00	No Ice 1/2" Ice	6.89 7.59	4.09 5.15	49.55 97.07
(4) DR85-17-02DPL2Q w/Mount Pipe	B	From Leg	4.75 -1.75 0.00	-20.0000	95.00	No Ice 1/2" Ice	6.89 7.59	4.09 5.15	49.55 97.07
(4) DR85-17-02DPL2Q w/Mount Pipe	C	From Leg	4.75 -1.75 0.00	-20.0000	95.00	No Ice 1/2" Ice	6.89 7.59	4.09 5.15	49.55 97.07
**									
4' Side Arm	B	From Leg	2.00 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice	1.00 1.50	3.00 4.00	60.00 95.00
**									
4' Side Arm	B	From Leg	2.00 0.00 0.00	0.0000	42.00	No Ice 1/2" Ice	1.00 1.50	3.00 4.00	60.00 95.00

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.6250	4	6216.62	13494.50	0.461 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4281.99	5437.50	0.787 ✓	1.333	Gusset Bearing
		Top Girt	A325N	0.6250	1	140.41	6442.72	0.022 ✓	1.333	Bolt Shear
T2	160	Leg	A325N	0.6250	4	16531.00	13494.60	1.225 ✓	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.6250	1	5709.55	5437.50	1.050 ✓	1.333	Gusset Bearing
T3	140	Leg	A325N	0.7500	4	26270.80	19438.50	1.351 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6222.67	5437.50	1.144 ✓	1.333	Gusset Bearing
T4	120	Leg	A325N	0.7500	4	34765.00	19438.50	1.788 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6394.55	5437.50	1.176 ✓	1.333	Gusset Bearing
T5	100	Leg	A325N	0.8750	4	42805.60	26457.60	1.618 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	7711.82	5437.50	1.418 ✗	1.333	Gusset Bearing
T6	80	Leg	A325N	0.8750	4	50080.70	26457.80	1.893 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	9064.33	5437.50	1.667 ✗	1.333	Gusset Bearing
T7	60	Leg	A325N	1.0000	4	57474.90	34557.50	1.663 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	10202.90	6442.72	1.584 ✗	1.333	Bolt Shear
T8	40	Leg	A325N	1.0000	4	64409.40	34557.50	1.864 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	10942.10	6442.72	1.698 ✗	1.333	Bolt Shear
T9	20	Leg	F1554-36	1.5000	6	47268.40	33823.20	1.398 ✗	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	12062.30	6442.72	1.872 ✗	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	P2x.154	20.00	4.00	61.0 K=1.00	16.934	1.0745	-31472.00	18195.60	1.730 ✗
T2	160 - 140	H1-3 (1.73 CR) - 3 P3x.216	20.03	5.01	51.7 K=1.00	17.761	2.2285	-81378.20	39580.00	2.056 ✗
T3	140 - 120	H1-3 (2.06 CR) - 39 P3.5x.318	20.03	6.68	61.3 K=1.00	16.901	3.6784	-127606.00	62170.80	2.053 ✗
T4	120 - 100	H1-3 (2.05 CR) - 66 P4x.337	20.03	6.68	54.3 K=1.00	17.536	4.4074	-169491.00	77287.50	2.193 ✗
T5	100 - 80	H1-3 (2.19 CR) - 87 P5x.375	20.03	6.68	43.6 K=1.00	18.423	6.1120	-213212.00	112603.00	1.893 ✗
T6	80 - 60	H1-3 (1.89 CR) - 108 P6x.432	20.03	10.02	54.8 K=1.00	17.492	8.4049	-251930.00	147022.00	1.714 ✗
T7	60 - 40	bolt (1.85 CR) - 129 P6x.432	20.03	10.02	54.8 K=1.00	17.492	8.4049	-292852.00	147022.00	1.992 ✗
T8	40 - 20	H1-3 (1.99 CR) - 144 P6x.432	20.03	10.02	54.8 K=1.00	17.492	8.4049	-332044.00	147022.00	2.258 ✗
		H1-3 (2.26 CR) - 159								

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	P8x.5	20.03	10.02	41.8 K=1.00	18.565	12.7627	-369122.00	236935.00	1.558 ✗
		H1-3 (1.56 CR) - 174								

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x1 1/2x3/16	4.63	2.32	86.3 K=1.00	14.634	0.6211	-4668.00	9089.35	0.514 ✓
T2	160 - 140	L2x1 1/2x3/16	6.52	3.40	126.8 K=1.00	9.287	0.6211	-5833.15	5768.02	1.011 ✓
T3	140 - 120	L2x2x3/16	9.07	4.73	144.1 K=1.00	7.192	0.7150	-6411.17	5142.26	1.247 ✓
T4	120 - 100	L2 1/2x2x3/16	10.69	5.53	155.4 K=1.00	6.181	0.8090	-6673.93	5000.70	1.335 ✗
		H1-3 (1.33 CR) - 90								
T5	100 - 80	L2 1/2x2 1/2x3/16	12.40	6.37	154.5 K=1.00	6.252	0.9020	-7856.21	5639.69	1.393 ✗
		H1-3 (1.39 CR) - 111								
T6	80 - 60	L3x3x3/16	15.56	8.07	162.5 K=1.00	5.658	1.0900	-9504.86	6167.56	1.541 ✗
		bolt (1.63 CR) - 132								
T7	60 - 40	L3 1/2x3 1/2x1/4	17.20	8.88	153.5 K=1.00	6.336	1.6900	-10202.90	10707.50	0.953 ✓
T8	40 - 20	L3 1/2x3 1/2x1/4	18.92	9.73	168.3 K=1.00	5.274	1.6900	-10942.10	8913.75	1.228 ✓
T9	20 - 0	L3 1/2x3 1/2x1/4	20.53	10.53	182.0 K=1.00	4.507	1.6900	-12062.30	7616.86	1.584 ✗
		bolt (1.87 CR) - 180								

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x3/16	4.00	4.00	121.8 K=1.00	10.019	0.7150	-140.41	7163.62	0.020 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	P2x.154	20.00	4.00	61.0	21.000	1.0745	24866.50	22565.20	1.102 ✓
T2	160 - 140	H1-3 (1.68 CR) - 1 P3x.216	20.03	5.01	51.7	21.000	2.2285	66123.90	46797.90	1.413 ✗
T3	140 - 120	H1-3 (2.02 CR) - 37 P3.5x.318	20.03	6.68	61.3	21.000	3.6784	105083.00	77246.70	1.360 ✗
T4	120 - 100	H1-3 (2.01 CR) - 64 P4x.337	20.03	6.68	54.3	21.000	4.4074	139060.00	92556.20	1.502 ✗
T5	100 - 80	H1-3 (2.15 CR) - 85 P5x.375	20.03	6.68	43.6	21.000	6.1120	171222.00	128351.00	1.334 ✗
T6	80 - 60	H1-3 (1.86 CR) - 106 P6x.432	20.03	10.02	54.8	21.000	8.4049	200323.00	176504.00	1.135 ✓
T7	60 - 40	bolt (1.89 CR) - 127 P6x.432	20.03	10.02	54.8	21.000	8.4049	229900.00	176504.00	1.303 ✓
T8	40 - 20	H1-3 (1.96 CR) - 142 P6x.432	20.03	10.02	54.8	21.000	8.4049	257638.00	176504.00	1.460 ✗
T9	20 - 0	H1-3 (2.21 CR) - 158 P8x.5	20.03	10.02	41.8	21.000	12.7627	283610.00	268017.00	1.058 ✓
		H1-3 (1.52 CR) - 173								

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x1 1/2x3/16	4.63	2.32	63.2	29.000	0.3604	4281.99	10450.20	0.410 ✓
T2	160 - 140	L2x1 1/2x3/16	6.52	3.40	92.9	29.000	0.3604	5709.55	10450.20	0.546 ✓
T3	140 - 120	L2x2x3/16	8.11	4.27	83.0	29.000	0.4308	6222.67	12492.70	0.498 ✓
T4	120 - 100	L2 1/2x2x3/16	10.69	5.53	110.7	29.000	0.5013	6394.55	14537.20	0.440 ✓
T5	100 - 80	L2 1/2x2 1/2x3/16	12.40	6.37	98.3	29.000	0.5710	7711.82	16559.90	0.466 ✓
T6	80 - 60	bolt (1.42 CR) - 112 L3x3x3/16	15.56	8.07	103.1	29.000	0.7120	9064.33	20648.90	0.439 ✓
T7	60 - 40	bolt (1.67 CR) - 133 L3 1/2x3 1/2x1/4	17.20	8.88	97.7	29.000	1.1269	9523.07	32679.40	0.291 ✓
T8	40 - 20	L3 1/2x3 1/2x1/4	18.06	9.30	102.4	29.000	1.1269	9917.75	32679.40	0.303 ✓
T9	20 - 0	L3 1/2x3 1/2x1/4	19.64	10.09	111.0	29.000	1.1269	10634.70	32679.40	0.325

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
										✓

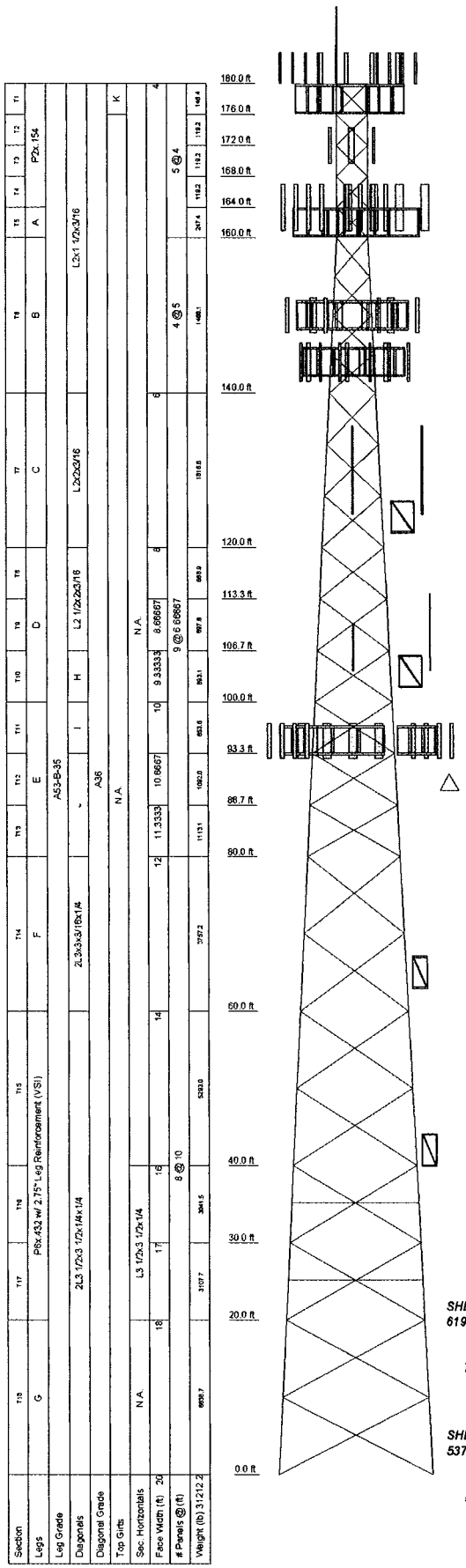
Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x3/16	4.00	4.00	77.8	29.000	0.4308	45.09	12492.70	0.004 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	180 - 160	Leg	P2x.154	3	-31472.00	24254.73	129.8	Fail ✗
		Diagonal	L2x1 1/2x3/16	9	-4668.00	12116.10	38.5	Pass
		Top Girt	L2x2x3/16	4	-140.41	9549.11	59.1 (b) 1.5 1.6 (b)	Pass
T2	160 - 140	Leg	P3x.216	39	-81378.20	52760.14	154.2	Fail ✗
		Diagonal	L2x1 1/2x3/16	42	-5833.15	7688.77	75.9 78.8 (b)	Pass
T3	140 - 120	Leg	P3.5x.318	66	-127606.00	82873.67	154.0	Fail ✗
		Diagonal	L2x2x3/16	69	-6411.17	6854.63	93.5	Pass
T4	120 - 100	Leg	P4x.337	87	-169491.00	103024.23	164.5	Fail ✗
		Diagonal	L2 1/2x2x3/16	90	-6673.93	6665.93	100.1	Fail ✗
T5	100 - 80	Leg	P5x.375	108	-213212.00	150099.79	142.0	Fail ✗
		Diagonal	L2 1/2x2 1/2x3/16	111	-7856.21	7517.71	104.5 106.4 (b)	Fail ✗
T6	80 - 60	Leg	P6x.432	129	-251930.00	195980.32	128.5 142.0 (b)	Fail ✗
		Diagonal	L3x3x3/16	132	-9504.86	8221.36	115.6 125.1 (b)	Fail ✗
T7	60 - 40	Leg	P6x.432	144	-292852.00	195980.32	149.4	Fail ✗
		Diagonal	L3 1/2x3 1/2x1/4	147	-10202.90	14273.10	71.5 118.8 (b)	Fail ✗
T8	40 - 20	Leg	P6x.432	159	-332044.00	195980.32	169.4	Fail ✗
		Diagonal	L3 1/2x3 1/2x1/4	162	-10942.10	11882.03	92.1 127.4 (b)	Fail ✗
T9	20 - 0	Leg	P8x.5	174	-369122.00	315834.34	116.9	Fail ✗
		Diagonal	L3 1/2x3 1/2x1/4	180	-12062.30	10153.27	118.8 140.5 (b)	Fail ✗
						Summary		
						Leg (T8)	169.4	Fail ✗
						Diagonal (T9)	140.5	Fail ✗
						Top Girt (T1)	1.6	Pass
						Bolt Checks	142.0	Fail ✗

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
						RATING =	169.4	Fail X



APPURTENANCES

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x10'	180	(2) LGP2140X (Cingular)	150
12' T-Frame Mount (1) (VSI)	178	(2) LGP2140X (Cingular)	150
12' T-Frame Mount (1) (VSI)	178	(2) LGP2140X (Cingular)	150
12' T-Frame Mount (1) (VSI)	178	(2) LGP13519 Diplexer (Cingular)	150
(4) DB844H90E-XY w/Mount Pipe	178	(2) LGP13519 Diplexer (Cingular)	150
(4) DB844H90E-XY w/Mount Pipe	178	(2) LGP13519 Diplexer (Cingular)	150
(4) DB844H90E-XY w/Mount Pipe	178	(2) 4'x2" Antenna Mount Pipe	150
Face Mount	172	(2) 4'x2" Antenna Mount Pipe	150
Face Mount	172	(2) 4'x2" Antenna Mount Pipe	150
Face Mount	172	12' Knockdown T-Frame (1) (VSI)	144
RR90-17-00DP w/Mount Pipe	172	12' Knockdown T-Frame (1) (VSI)	144
RR90-17-00DP w/Mount Pipe	172	12' Knockdown T-Frame (1) (VSI)	144
RR90-17-00DP w/Mount Pipe	172	(3) DB980H90E-M w/Mount Pipe	144
12' Angle Sector Frame Mount (1) (VSI)	162	(3) DB980H90E-M w/Mount Pipe	144
		(3) DB980H90E-M w/Mount Pipe	144
12' Angle Sector Frame Mount (1) (VSI)	162	6' Sidearm (Pipe) (VSI)	124
		6' Sidearm (Pipe) (VSI)	124
12' Angle Sector Frame Mount (1) (VSI)	162	DB809K-Y	124
		DB809K-Y	124
(2) DB948F65T2E-M w/Mount Pipe	162	6' Sidearm (Pipe) (VSI)	104
(2) DB948F65T2E-M w/Mount Pipe	162	6' Sidearm (Pipe) (VSI)	104
(2) DB948F65T2E-M w/Mount Pipe	162	DB810M-XC	104
(2) ALP 11011-N w/Mount Pipe	162	DB809K-Y	104
(2) ALP 11011-N w/Mount Pipe	162	Pirod 12' T-Frame Sector Mount (1) (VSI)	95
(2) ALP 11011-N w/Mount Pipe	162		
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	150	Pirod 12' T-Frame Sector Mount (1) (VSI)	95
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	150	Pirod 12' T-Frame Sector Mount (1) (VSI)	95
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	150	(4) DR85-17-02DPL2Q w/Mount Pipe	95
(2) 7770.00 w/ mount pipe (Cingular)	150	(4) DR85-17-02DPL2Q w/Mount Pipe	95
(2) 7770.00 w/ mount pipe (Cingular)	150	(4) DR85-17-02DPL2Q w/Mount Pipe	95
(2) 7770.00 w/ mount pipe (Cingular)	150	4' Side Arm	65
		4' Side Arm	42

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P2x.154 w/ 2" Leg Reinforcement (VSI)	G	P8 x .5 w/ 2.75" Leg Reinforcement (VSI)
B	P3x.216 w/ 2" Leg Reinforcement (VSI)	H	2L2 1/2x2x3/16x1/4
C	P3.5x.318 w/ 2" Leg Reinforcement (VSI)	I	L2 1/2x2 1/2x3/16
D	P4x.337 w/ 2" Leg Reinforcement (VSI)	J	2L2 1/2x2 1/2x3/16x1/4
E	P5x.375 w/ 2" Leg Reinforcement (VSI)	K	L2x2x3/16
F	P6x.432 w/ 2" Leg Reinforcement (VSI)		

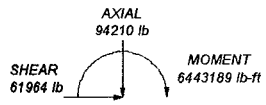
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A36	36 ksi	58 ksi

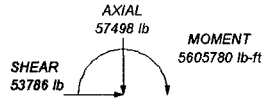
TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 100.3%

MAX PIER FORCES:
DOWN: 403401 lb
UPLIFT: -305875 lb
SHEAR: 39787 lb



TORQUE 41445 lb-ft
74 mph WIND - 0.5000 in ICE



TORQUE 34409 lb-ft
REACTIONS - 85 mph WIND

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job:	***BRG 124, CT BU#806353 (Modified)***		
Project:	***Vertical Structures Job No. 2005-004-092***		
Client:	Crown Castle	Drawn by: Kyle Meehan	App'd
Code:	TIA/EIA-222-F	Date: 12/09/05	Scale: NTS
Path:			Dwg No. E-1

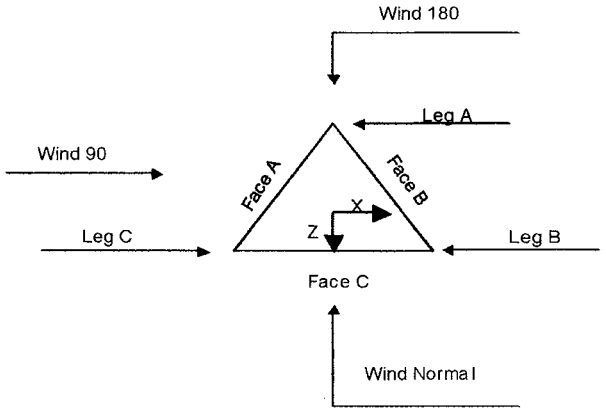
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	√ Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	180.00-176.00			4.00	1	4.00
T2	176.00-172.00			4.00	1	4.00
T3	172.00-168.00			4.00	1	4.00
T4	168.00-164.00			4.00	1	4.00
T5	164.00-160.00			4.00	1	4.00
T6	160.00-140.00			4.00	1	20.00
T7	140.00-120.00			6.00	1	20.00
T8	120.00-113.33			8.00	1	6.67
T9	113.33-106.67			8.67	1	6.67
T10	106.67-100.00			9.33	1	6.67
T11	100.00-93.33			10.00	1	6.67
T12	93.33-86.67			10.67	1	6.67
T13	86.67-80.00			11.33	1	6.67
T14	80.00-60.00			12.00	1	20.00
T15	60.00-40.00			14.00	1	20.00
T16	40.00-30.00			16.00	1	10.00
T17	30.00-20.00			17.00	1	10.00
T18	20.00-0.00			18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	180.00-176.00	4.00	X Brace	No	No	0.0000	0.0000
T2	176.00-172.00	4.00	X Brace	No	No	0.0000	0.0000
T3	172.00-168.00	4.00	X Brace	No	No	0.0000	0.0000
T4	168.00-164.00	4.00	X Brace	No	No	0.0000	0.0000
T5	164.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T6	160.00-140.00	5.00	X Brace	No	No	0.0000	0.0000
T7	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T8	120.00-113.33	6.67	X Brace	No	No	0.0000	0.0000
T9	113.33-106.67	6.67	X Brace	No	No	0.0000	0.0000
T10	106.67-100.00	6.67	X Brace	No	No	0.0000	0.0000
T11	100.00-93.33	6.67	X Brace	No	No	0.0000	0.0000
T12	93.33-86.67	6.67	X Brace	No	No	0.0000	0.0000
T13	86.67-80.00	6.67	X Brace	No	No	0.0000	0.0000
T14	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T15	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T16	40.00-30.00	10.00	X Brace	No	Yes	0.0000	0.0000
T17	30.00-20.00	10.00	X Brace	No	Yes	0.0000	0.0000
T18	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-176.00	Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T2 176.00-172.00	Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T3 172.00-168.00	Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T4 168.00-164.00	Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T5 164.00-160.00	Arbitrary Shape	P2x.154 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T6 160.00-140.00	Arbitrary Shape	P3x.216 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T7 140.00-120.00	Arbitrary Shape	P3.5x.318 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T8 120.00-113.33	Arbitrary Shape	P4x.337 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T9 113.33-106.67	Arbitrary Shape	P4x.337 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T10 106.67-100.00	Arbitrary Shape	P4x.337 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Double Angle	2L2 1/2x2x3/16x1/4	A36 (36 ksi)
T11 100.00-93.33	Arbitrary Shape	P5x.375 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T12 93.33-86.67	Arbitrary Shape	P5x.375 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Double Angle	2L2 1/2x2 1/2x3/16x1/4	A36 (36 ksi)
T13 86.67-80.00	Arbitrary Shape	P5x.375 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Double Angle	2L2 1/2x2 1/2x3/16x1/4	A36 (36 ksi)
T14 80.00-60.00	Arbitrary Shape	P6x.432 w/ 2" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T15 60.00-40.00	Arbitrary Shape	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A36 (36 ksi)
T16 40.00-30.00	Arbitrary Shape	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	A53-B-35 (35 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A36 (36 ksi)
T17 30.00-20.00	Arbitrary Shape	P6x.432 w/ 2.75" Leg	A53-B-35	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A36

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T18 20.00-0.00	Arbitrary Shape	Reinforcement (VSI) P8 x .5 w/ 2.75" Leg Reinforcement (VSI)	(35 ksi) A53-B-35 (35 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	(36 ksi) A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-176.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T16 40.00-30.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T17 30.00-20.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-176.00	0.90	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T2 176.00-172.00	0.90	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T3 172.00-168.00	0.90	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T4 168.00-164.00	0.90	0.1500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T5 164.00-160.00	0.90	0.1500	A36 (36 ksi)	1	1	1	27.8400	0.0000
T6 160.00-140.00	3.50	0.1500	A36 (36 ksi)	1	1	1	40.8000	0.0000
T7 140.00-120.00	2.50	0.1500	A36 (36 ksi)	1	1	1	56.7600	0.0000
T8 120.00-113.33	0.83	0.1500	A36 (36 ksi)	1	1	1	60.1200	0.0000
T9 113.33-	0.83	0.1500	A36	1	1	1	63.1200	0.0000

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
106.67			(36 ksi)					
T10 106.67-100.00	0.83	0.2500	A36 (36 ksi)	1	1	1	66.3600	0.0000
T11 100.00-93.33	0.83	0.1500	A36 (36 ksi)	1	1	1	69.7200	0.0000
T12 93.33-86.67	0.83	0.2500	A36 (36 ksi)	1	1	1	73.0800	0.0000
T13 86.67-80.00	0.83	0.2500	A36 (36 ksi)	1	1	1	76.4400	0.0000
T14 80.00-60.00	1.50	0.2500	A36 (36 ksi)	1	1	1	96.8400	0.0000
T15 60.00-40.00	1.50	0.2500	A36 (36 ksi)	1	1	1	106.5600	0.0000
T16 40.00-30.00	1.50	0.2500	A36 (36 ksi)	1	1	1	111.6000	0.0000
T17 30.00-20.00	1.50	0.2500	A36 (36 ksi)	1	1	1	115.8000	0.0000
T18 20.00-0.00	1.50	0.2500	A36 (36 ksi)	1	1	1	126.3600	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-176.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 176.00-172.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 172.00-168.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 168.00-164.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 164.00-160.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 160.00-140.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 140.00-120.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 120.00-113.33	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 113.33-106.67	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 106.67-100.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 100.00-93.33	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T12 93.33-86.67	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T13 86.67-80.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T14 80.00-	No	No	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors[1] X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
60.00				1	1	1	1	1	1	1
T15 60.00-40.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T16 40.00-30.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T17 30.00-20.00	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T18 20.00-0.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	U	Diagonal Net Width Deduct in	U	Top Girt Net Width Deduct in	U	Bottom Girt Net Width Deduct in	U	Mid Girt Net Width Deduct in	U	Long Horizontal Net Width Deduct in	U	Short Horizontal Net Width Deduct in	U
T1 180.00-176.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 176.00-172.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 172.00-168.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 168.00-164.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 164.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 120.00-113.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 113.33-106.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 106.67-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 100.00-93.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 93.33-86.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 86.67-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T16 40.00-30.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T17 30.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T18 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 180.00-176.00	4.5000	4.1875	4.5000	4.1875	0.0000	0.0000	0.0000	0.0000
T2 176.00-172.00	4.5000	4.1875	4.5000	4.1875	0.0000	0.0000	0.0000	0.0000
T3 172.00-168.00	4.5000	4.1875	4.5000	4.1875	0.0000	0.0000	0.0000	0.0000
T4 168.00-164.00	4.5000	4.1875	4.5000	4.1875	0.0000	0.0000	0.0000	0.0000
T5 164.00-160.00	4.5000	4.1875	4.5000	4.1875	0.0000	0.0000	0.0000	0.0000
T6 160.00-140.00	4.6000	4.7500	4.6000	4.7500	0.0000	0.0000	0.0000	0.0000
T7 140.00-120.00	4.5000	5.0000	4.0000	5.0000	0.0000	0.0000	0.0000	0.0000
T8 120.00-113.33	3.5000	5.2500	3.5000	5.2500	0.0000	0.0000	0.0000	0.0000
T9 113.33-106.67	3.5000	5.2500	3.5000	5.2500	0.0000	0.0000	0.0000	0.0000
T10 106.67-100.00	3.5000	5.2500	3.5000	5.2500	0.0000	0.0000	0.0000	0.0000
T11 100.00-93.33	2.5000	5.7815	2.5000	5.7815	0.0000	0.0000	0.0000	0.0000
T12 93.33-86.67	2.5000	5.7815	2.5000	5.7815	0.0000	0.0000	0.0000	0.0000
T13 86.67-80.00	2.5000	5.7815	2.5000	5.7815	0.0000	0.0000	0.0000	0.0000
T14 80.00-60.00	4.0000	6.3125	4.0000	6.3125	0.0000	0.0000	0.0000	0.0000
T15 60.00-40.00	4.0000	6.3125	4.0000	6.3125	0.0000	0.0000	0.0000	0.0000
T16 40.00-30.00	3.9000	6.3125	3.9000	6.3125	0.0000	0.0000	0.0000	0.0000
T17 30.00-20.00	4.0000	7.3125	4.0000	7.3125	0.0000	0.0000	0.0000	0.0000
T18 20.00-0.00	4.0000	7.3125	4.0000	7.3125	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 180.00-176.00	Flange	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	1	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 176.00-172.00	Flange	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 172.00-168.00	Flange	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 168.00-164.00	Flange	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 164.00-160.00	Flange	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 160.00-140.00	Flange	0.6250 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 140.00-120.00	Flange	0.7500 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 120.00-113.33	Flange	0.7500 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 113.33-106.67	Flange	0.7500 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 106.67-100.00	Flange	0.7500 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 100.00-93.33	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T12 93.33-86.67	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T13 86.67-80.00	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T14 80.00-60.00	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T15 60.00-40.00	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T16 40.00-30.00	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	0
T17 30.00-20.00	Flange	1.5000 F1554-36	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T18 20.00-0.00	Flange	1.5000 F1554-36	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Climbing Ladder (Af) **	B	Yes	Af (CfAe)	180.00 - 0.00	1.0000	0	1	1	4.0000	4.0000	14.0000	7.90
Feedline Ladder (Af)	B	Yes	Af (CfAe)	180.00 - 5.00	-0.5000	-0.4	1	1	3.0000	3.0000	12.0000	8.40
LDF6-50A (1-1/4 FOAM) **	B	Yes	Ar (CfAe)	180.00 - 5.00	-1.0000	-0.4	12	12	0.9500	1.5500		0.66
Feedline	A	Yes	Af (CfAe)	150.00 - 5.00	-0.5000	0.4	2	1	1.0000	3.0000	12.0000	8.40

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Ladder (Af) Feedline	A	Yes	Af (CfAe)	172.00 - 150.00	-0.5000	0.4	1	1	1.0000	3.0000	12.0000	8.40
Ladder (Af) CR 50 1873 (1-5/8 FOAM) (Cingular)	A	Yes	Ar (CfAe)	150.00 - 5.00	-1.0000	0.4	18	12	1.0000	1.9800		0.83
CR 50 1873 (1-5/8 FOAM)	A	Yes	Ar (CfAe)	172.00 - 150.00	-1.0000	0.4	6	6	1.0000	1.9800		0.83
LDF2-50A (3/8 FOAM) **	A	Yes	Ar (CfAe)	104.00 - 5.00	1.0000	0.3	2	2	1.0000	0.4400		0.08
Feedline Ladder (Af)	C	Yes	Af (CfAe)	160.00 - 5.00	0.5000	0	1	1	3.0000	3.0000	12.0000	8.40
LDF7-50A (1-5/8 FOAM)	C	Yes	Ar (CfAe)	164.00 - 5.00	1.0000	-0.05	6	6	1.0000	1.9800		0.82
LDF6-50A (1-1/4 FOAM)	C	Yes	Ar (CfAe)	164.00 - 5.00	1.0000	0.05	6	6	1.0000	1.5500		0.66
LDF5-50A (7/8 FOAM) **	C	Yes	Ar (CfAe)	124.00 - 5.00	1.0000	0.1	2	2	1.0000	1.0900		0.33
Feedline Ladder (Af)	C	Yes	Af (CfAe)	144.00 - 5.00	0.5000	-0.15	1	1	3.0000	3.0000	12.0000	8.40
LDF7-50A (1-5/8 FOAM) **	C	Yes	Ar (CfAe)	144.00 - 5.00	1.0000	-0.15	9	5	1.0000	1.9800		0.82
Feedline Ladder (Af)	A	Yes	Af (CfAe)	95.00 - 5.00	0.5000	0	1	1	3.0000	3.0000	12.0000	8.40
LDF7-50A (1-5/8 FOAM)	A	Yes	Ar (CfAe)	95.00 - 5.00	1.0000	0.05	24	12	1.0000	1.9800		0.82
2 3/4" Leg Reinforcement	A	No	Ar (Leg)	60.00 - 0.00	0.0000	0.05	1	1	2.7500	3.0000		0.00
2 3/4" Leg Reinforcement	B	No	Ar (Leg)	60.00 - 0.00	0.0000	0.05	1	1	2.7500	3.0000		0.00
2 3/4" Leg Reinforcement	C	No	Ar (Leg)	60.00 - 0.00	0.0000	0.05	1	1	2.7500	3.0000		0.00
2" Leg Reinforcement	A	No	Ar (Leg)	167.00 - 60.00	0.0000	0.05	1	1	2.0000	2.2000		0.00
2" Leg Reinforcement	B	No	Ar (Leg)	167.00 - 60.00	0.0000	0.05	1	1	2.0000	2.2000		0.00
2" Leg Reinforcement	C	No	Ar (Leg)	167.00 - 60.00	0.0000	0.05	1	1	2.0000	2.2000		0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-176.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.200	2.333	0.000	0.000	96.88
		C	0.000	0.000	0.000	0.000	0.00
T2	176.00-172.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.200	2.333	0.000	0.000	96.88
		C	0.000	0.000	0.000	0.000	0.00
T3	172.00-168.00	A	3.960	1.000	0.000	0.000	53.52
		B	6.200	2.333	0.000	0.000	96.88
		C	0.000	0.000	0.000	0.000	0.00
T4	168.00-164.00	A	5.060	1.000	0.000	0.000	53.52

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B	7.300	2.333	0.000	0.000	96.88
		C	1.100	0.000	0.000	0.000	0.00
T5	164.00-160.00	A	5.427	1.000	0.000	0.000	53.52
		B	7.667	2.333	0.000	0.000	96.88
		C	8.527	0.000	0.000	0.000	35.52
T6	160.00-140.00	A	37.033	5.000	0.000	0.000	451.20
		B	38.333	11.667	0.000	0.000	484.40
		C	45.933	6.000	0.000	0.000	408.72
T7	140.00-120.00	A	46.933	5.000	0.000	0.000	634.80
		B	38.333	11.667	0.000	0.000	484.40
		C	59.860	10.000	0.000	0.000	663.84
T8	120.00-113.33	A	15.644	1.667	0.000	0.000	211.60
		B	12.778	3.889	0.000	0.000	161.47
		C	20.922	3.333	0.000	0.000	224.80
T9	113.33-106.67	A	15.644	1.667	0.000	0.000	211.60
		B	12.778	3.889	0.000	0.000	161.47
		C	20.922	3.333	0.000	0.000	224.80
T10	106.67-100.00	A	15.938	1.667	0.000	0.000	212.24
		B	12.778	3.889	0.000	0.000	161.47
		C	20.922	3.333	0.000	0.000	224.80
T11	100.00-93.33	A	19.433	2.083	0.000	0.000	259.47
		B	12.778	3.889	0.000	0.000	161.47
		C	20.922	3.333	0.000	0.000	224.80
T12	93.33-86.67	A	29.333	3.333	0.000	0.000	399.87
		B	12.778	3.889	0.000	0.000	161.47
		C	20.922	3.333	0.000	0.000	224.80
T13	86.67-80.00	A	29.333	3.333	0.000	0.000	399.87
		B	12.778	3.889	0.000	0.000	161.47
		C	20.922	3.333	0.000	0.000	224.80
T14	80.00-60.00	A	88.000	10.000	0.000	0.000	1199.60
		B	38.333	11.667	0.000	0.000	484.40
		C	62.767	10.000	0.000	0.000	674.40
T15	60.00-40.00	A	90.667	10.000	0.000	0.000	1199.60
		B	41.000	11.667	0.000	0.000	484.40
		C	65.433	10.000	0.000	0.000	674.40
T16	40.00-30.00	A	45.333	5.000	0.000	0.000	599.80
		B	20.500	5.833	0.000	0.000	242.20
		C	32.717	5.000	0.000	0.000	337.20
T17	30.00-20.00	A	45.333	5.000	0.000	0.000	599.80
		B	20.500	5.833	0.000	0.000	242.20
		C	32.717	5.000	0.000	0.000	337.20
T18	20.00-0.00	A	70.500	7.500	0.000	0.000	899.70
		B	33.250	10.417	0.000	0.000	402.80
		C	51.575	7.500	0.000	0.000	505.80

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-176.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.850	11.944	0.000	0.000	201.85
		C		0.000	0.000	0.000	0.000	0.00
T2	176.00-172.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.850	11.944	0.000	0.000	201.85
		C		0.000	0.000	0.000	0.000	0.00
T3	172.00-168.00	A	0.500	0.993	6.189	0.000	0.000	115.51
		B		0.850	11.944	0.000	0.000	201.85

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C		0.000	0.000	0.000	0.000	0.00
T4	168.00-164.00	A	0.500	2.593	6.189	0.000	0.000	120.45
		B		2.450	11.944	0.000	0.000	206.80
		C		1.600	0.000	0.000	0.000	4.95
T5	164.00-160.00	A	0.500	3.127	6.189	0.000	0.000	122.10
		B		2.983	11.944	0.000	0.000	208.45
		C		3.977	9.217	0.000	0.000	134.21
T6	160.00-140.00	A	0.500	15.633	45.844	0.000	0.000	1026.51
		B		14.917	59.722	0.000	0.000	1042.24
		C		20.877	57.390	0.000	0.000	1028.37
T7	140.00-120.00	A	0.500	15.633	60.744	0.000	0.000	1442.49
		B		14.917	59.722	0.000	0.000	1042.24
		C		25.547	78.869	0.000	0.000	1581.47
T8	120.00-113.33	A	0.500	5.211	20.248	0.000	0.000	480.83
		B		4.972	19.907	0.000	0.000	347.41
		C		9.444	27.219	0.000	0.000	542.98
T9	113.33-106.67	A	0.500	5.211	20.248	0.000	0.000	480.83
		B		4.972	19.907	0.000	0.000	347.41
		C		9.444	27.219	0.000	0.000	542.98
T10	106.67-100.00	A	0.500	5.691	20.728	0.000	0.000	486.76
		B		4.972	19.907	0.000	0.000	347.41
		C		9.444	27.219	0.000	0.000	542.98
T11	100.00-93.33	A	0.500	6.425	26.110	0.000	0.000	629.78
		B		4.972	19.907	0.000	0.000	347.41
		C		9.444	27.219	0.000	0.000	542.98
T12	93.33-86.67	A	0.500	7.667	41.296	0.000	0.000	1047.01
		B		4.972	19.907	0.000	0.000	347.41
		C		9.444	27.219	0.000	0.000	542.98
T13	86.67-80.00	A	0.500	7.667	41.296	0.000	0.000	1047.01
		B		4.972	19.907	0.000	0.000	347.41
		C		9.444	27.219	0.000	0.000	542.98
T14	80.00-60.00	A	0.500	23.000	123.889	0.000	0.000	3141.02
		B		14.917	59.722	0.000	0.000	1042.24
		C		28.333	81.656	0.000	0.000	1628.94
T15	60.00-40.00	A	0.500	25.667	123.889	0.000	0.000	3150.79
		B		17.583	59.722	0.000	0.000	1052.02
		C		31.000	81.656	0.000	0.000	1638.72
T16	40.00-30.00	A	0.500	12.833	61.944	0.000	0.000	1575.40
		B		8.792	29.861	0.000	0.000	526.01
		C		15.500	40.828	0.000	0.000	819.36
T17	30.00-20.00	A	0.500	12.833	61.944	0.000	0.000	1575.40
		B		8.792	29.861	0.000	0.000	526.01
		C		15.500	40.828	0.000	0.000	819.36
T18	20.00-0.00	A	0.500	22.583	92.917	0.000	0.000	2373.78
		B		16.521	46.736	0.000	0.000	854.66
		C		26.583	61.242	0.000	0.000	1239.73

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-176.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	1.361	2.769
		C	0.000	0.000	0.000	0.000
T2	176.00-172.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	1.006	2.045

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
		C	0.000	0.000	0.000	0.000
T3	172.00-168.00	A	0.000	0.000	0.585	1.146
		B	0.000	0.000	1.006	2.045
		C	0.000	0.000	0.000	0.000
T4	168.00-164.00	A	0.000	0.000	0.585	1.146
		B	0.000	0.000	1.006	2.045
		C	0.000	0.000	0.000	0.000
T5	164.00-160.00	A	0.000	0.000	0.585	1.146
		B	0.000	0.000	1.006	2.045
		C	0.000	0.000	0.832	1.738
T6	160.00-140.00	A	0.000	0.000	3.297	6.507
		B	0.000	0.000	4.054	8.245
		C	0.000	0.000	4.238	8.648
T7	140.00-120.00	A	0.000	0.000	3.090	6.122
		B	0.000	0.000	2.956	6.013
		C	0.000	0.000	4.332	8.764
T8	120.00-113.33	A	0.000	0.000	1.190	2.239
		B	0.000	0.000	1.138	2.199
		C	0.000	0.000	1.746	3.394
T9	113.33-106.67	A	0.000	0.000	1.156	2.176
		B	0.000	0.000	1.106	2.137
		C	0.000	0.000	1.696	3.298
T10	106.67-100.00	A	0.000	0.000	1.151	2.216
		B	0.000	0.000	1.080	2.086
		C	0.000	0.000	1.656	3.219
T11	100.00-93.33	A	0.000	0.000	1.418	2.752
		B	0.000	0.000	1.058	2.044
		C	0.000	0.000	1.622	3.154
T12	93.33-86.67	A	0.000	0.000	2.209	4.238
		B	0.000	0.000	1.039	2.008
		C	0.000	0.000	1.594	3.099
T13	86.67-80.00	A	0.000	0.000	2.175	4.174
		B	0.000	0.000	1.024	1.978
		C	0.000	0.000	1.570	3.052
T14	80.00-60.00	A	0.000	0.000	5.723	10.595
		B	0.000	0.000	2.693	5.021
		C	0.000	0.000	4.130	7.748
T15	60.00-40.00	A	0.000	0.000	6.359	11.467
		B	0.000	0.000	2.992	5.434
		C	0.000	0.000	4.589	8.386
T16	40.00-30.00	A	0.000	0.000	4.414	7.960
		B	0.000	0.000	2.077	3.772
		C	0.000	0.000	3.186	5.821
T17	30.00-20.00	A	0.000	0.000	4.368	7.876
		B	0.000	0.000	2.055	3.733
		C	0.000	0.000	3.152	5.760
T18	20.00-0.00	A	0.000	0.000	4.483	8.084
		B	0.000	0.000	2.220	3.995
		C	0.000	0.000	3.236	5.912

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-176.00	0.9490	-6.6306	0.8035	-6.4553
T2	176.00-172.00	1.0711	-7.4837	0.9225	-7.4206

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T3	172.00-168.00	0.7641	-10.1344	0.6566	-9.4652
T4	168.00-164.00	0.6747	-8.9479	0.5748	-8.2862
T5	164.00-160.00	0.5867	-4.3392	0.4761	-4.0749
T6	160.00-140.00	0.6469	-5.5186	0.5157	-5.5414
T7	140.00-120.00	1.4175	-6.6915	1.1412	-7.1383
T8	120.00-113.33	1.4747	-7.1766	1.2241	-7.8587
T9	113.33-106.67	1.5893	-7.7525	1.3231	-8.4848
T10	106.67-100.00	1.6561	-8.4426	1.3685	-9.1902
T11	100.00-93.33	0.4442	-9.3205	0.2182	-10.0854
T12	93.33-86.67	-2.7705	-11.4286	-2.8464	-12.0144
T13	86.67-80.00	-2.8928	-12.0650	-2.9754	-12.6882
T14	80.00-60.00	-3.1296	-13.2994	-3.2688	-14.1721
T15	60.00-40.00	-3.3144	-14.4014	-3.5141	-15.5658
T16	40.00-30.00	-3.1948	-14.0673	-3.4154	-15.3604
T17	30.00-20.00	-3.3310	-14.7795	-3.5666	-16.1545
T18	20.00-0.00	-2.8701	-14.2914	-3.2199	-15.9472

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	lb
Lightning Rod 1"x10'	C	From Leg	0.00 / 0.00 / 5.00	0.0000	180.00	No Ice	1.00	1.00	40.00
						1/2" Ice	2.02	2.02	49.26
**									
12' T-Frame Mount (1) (VSI)	A	From Leg	3.00 / 0.50 / 0.00	10.0000	178.00	No Ice	14.40	10.50	465.00
						1/2" Ice	20.10	13.80	600.00
12' T-Frame Mount (1) (VSI)	B	From Leg	3.00 / 0.50 / 0.00	10.0000	178.00	No Ice	14.40	10.50	465.00
						1/2" Ice	20.10	13.80	600.00
12' T-Frame Mount (1) (VSI)	C	From Leg	3.00 / 0.50 / 0.00	10.0000	178.00	No Ice	14.40	10.50	465.00
						1/2" Ice	20.10	13.80	600.00
(4) DB844H90E-XY w/Mount Pipe	A	From Leg	5.00 / 1.00 / 4.00	10.0000	178.00	No Ice	3.58	5.40	35.55
						1/2" Ice	4.20	6.49	76.59
(4) DB844H90E-XY w/Mount Pipe	B	From Leg	5.00 / 1.00 / 4.00	10.0000	178.00	No Ice	3.58	5.40	35.55
						1/2" Ice	4.20	6.49	76.59
(4) DB844H90E-XY w/Mount Pipe	C	From Leg	5.00 / 1.00 / 4.00	10.0000	178.00	No Ice	3.58	5.40	35.55
						1/2" Ice	4.20	6.49	76.59
**									
Face Mount	A	From Face	0.50 / 0.00 / 0.00	0.0000	172.00	No Ice	2.67	0.20	25.52
						1/2" Ice	4.00	0.40	40.24
Face Mount	B	From Face	0.50 / 0.00 / 0.00	0.0000	172.00	No Ice	2.67	0.20	25.52
						1/2" Ice	4.00	0.40	40.24
Face Mount	C	From Face	0.50	0.0000	172.00	No Ice	2.67	0.20	25.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	4.00	0.40	40.24
			0.00						
RR90-17-00DP w/Mount Pipe	A	From Leg	1.00	30.0000	172.00	No Ice	4.91	3.64	43.55
			0.00			1/2" Ice	5.57	4.70	81.64
			0.00						
RR90-17-00DP w/Mount Pipe	B	From Leg	1.00	30.0000	172.00	No Ice	4.91	3.64	43.55
			0.00			1/2" Ice	5.57	4.70	81.64
			0.00						
RR90-17-00DP w/Mount Pipe	C	From Leg	1.00	30.0000	172.00	No Ice	4.91	3.64	43.55
			0.00			1/2" Ice	5.57	4.70	81.64
			0.00						
**									
12' Angle Sector Frame Mount (1) (VSI)	A	From Leg	1.50	60.0000	162.00	No Ice	20.60	15.00	465.00
			2.75			1/2" Ice	28.70	19.70	600.00
			0.00						
12' Angle Sector Frame Mount (1) (VSI)	B	From Leg	1.50	60.0000	162.00	No Ice	20.60	15.00	465.00
			2.75			1/2" Ice	28.70	19.70	600.00
			0.00						
12' Angle Sector Frame Mount (1) (VSI)	C	From Leg	1.50	60.0000	162.00	No Ice	20.60	15.00	465.00
			2.75			1/2" Ice	28.70	19.70	600.00
			0.00						
(2) DB948F65T2E-M w/Mount Pipe	A	From Leg	2.50	60.0000	162.00	No Ice	5.65	4.96	39.55
			4.50			1/2" Ice	6.35	6.06	87.28
			2.00						
(2) DB948F65T2E-M w/Mount Pipe	B	From Leg	2.50	60.0000	162.00	No Ice	5.65	4.96	39.55
			4.50			1/2" Ice	6.35	6.06	87.28
			2.00						
(2) DB948F65T2E-M w/Mount Pipe	C	From Leg	2.50	60.0000	162.00	No Ice	5.65	4.96	39.55
			4.50			1/2" Ice	6.35	6.06	87.28
			2.00						
(2) ALP 11011-N w/Mount Pipe	A	From Leg	2.50	60.0000	162.00	No Ice	3.91	6.62	40.95
			4.50			1/2" Ice	4.53	7.75	87.99
			2.00						
(2) ALP 11011-N w/Mount Pipe	B	From Leg	2.50	60.0000	162.00	No Ice	3.91	6.62	40.95
			4.50			1/2" Ice	4.53	7.75	87.99
			2.00						
(2) ALP 11011-N w/Mount Pipe	C	From Leg	2.50	60.0000	162.00	No Ice	3.91	6.62	40.95
			4.50			1/2" Ice	4.53	7.75	87.99
			2.00						
**									
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	A	From Leg	2.00	3.0000	150.00	No Ice	19.00	13.50	445.00
			0.00			1/2" Ice	27.00	19.50	595.00
			0.00						
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	B	From Leg	2.00	3.0000	150.00	No Ice	19.00	13.50	445.00
			0.00			1/2" Ice	27.00	19.50	595.00
			0.00						
Andrew 12'-6" Sector Frame (MI-00-83) (VSI) (Cingular)	C	From Leg	2.00	3.0000	150.00	No Ice	19.00	13.50	445.00
			0.00			1/2" Ice	27.00	19.50	595.00
			0.00						
(2) 7770.00 w/ mount pipe (Cingular)	A	From Leg	4.00	3.0000	150.00	No Ice	6.22	4.35	56.90
			0.00			1/2" Ice	6.77	5.20	102.99
			0.00						
(2) 7770.00 w/ mount pipe (Cingular)	B	From Leg	4.00	3.0000	150.00	No Ice	6.22	4.35	56.90
			0.00			1/2" Ice	6.77	5.20	102.99
			0.00						
(2) 7770.00 w/ mount pipe (Cingular)	C	From Leg	4.00	3.0000	150.00	No Ice	6.22	4.35	56.90
			0.00			1/2" Ice	6.77	5.20	102.99

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: Horz ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00								
(2) LGP2140X	A	From Leg	4.00			3.0000	150.00	No Ice	1.23	0.37	17.50
(Cingular)			0.00					1/2" Ice	1.38	0.48	24.46
			0.00								
(2) LGP2140X	B	From Leg	4.00			3.0000	150.00	No Ice	1.23	0.37	17.50
(Cingular)			0.00					1/2" Ice	1.38	0.48	24.46
			0.00								
(2) LGP2140X	C	From Leg	4.00			3.0000	150.00	No Ice	1.23	0.37	17.50
(Cingular)			0.00					1/2" Ice	1.38	0.48	24.46
			0.00								
(2) LGP13519 Diplexer	A	From Leg	4.00			3.0000	150.00	No Ice	0.27	0.18	5.50
(Cingular)			0.00					1/2" Ice	0.34	0.25	7.92
			0.00								
(2) LGP13519 Diplexer	B	From Leg	4.00			3.0000	150.00	No Ice	0.27	0.18	5.50
(Cingular)			0.00					1/2" Ice	0.34	0.25	7.92
			0.00								
(2) LGP13519 Diplexer	C	From Leg	4.00			3.0000	150.00	No Ice	0.27	0.18	5.50
(Cingular)			0.00					1/2" Ice	0.34	0.25	7.92
			0.00								
(2) 4'x2" Antenna Mount Pipe	A	From Leg	4.00			0.0000	150.00	No Ice	0.87	0.87	13.33
			0.00					1/2" Ice	1.11	1.11	20.65
			0.00								
(2) 4'x2" Antenna Mount Pipe	B	From Leg	4.00			0.0000	150.00	No Ice	0.87	0.87	13.33
			0.00					1/2" Ice	1.11	1.11	20.65
			0.00								
(2) 4'x2" Antenna Mount Pipe	C	From Leg	4.00			0.0000	150.00	No Ice	0.87	0.87	13.33
			0.00					1/2" Ice	1.11	1.11	20.65
			0.00								
**											
12' Knockdown T-Frame (1)	A	From Leg	0.95			-20.0000	144.00	No Ice	8.90	6.00	235.00
(VSI)			-0.35					1/2" Ice	12.60	8.70	340.00
			0.00								
12' Knockdown T-Frame (1)	B	From Leg	0.95			-20.0000	144.00	No Ice	8.90	6.00	235.00
(VSI)			-0.35					1/2" Ice	12.60	8.70	340.00
			0.00								
12' Knockdown T-Frame (1)	C	From Leg	0.95			-20.0000	144.00	No Ice	8.90	6.00	235.00
(VSI)			-0.35					1/2" Ice	12.60	8.70	340.00
			0.00								
(3) DB980H90E-M w/Mount	A	From Leg	1.90			-20.0000	144.00	No Ice	4.27	3.86	34.05
Pipe			-0.70					1/2" Ice	4.86	4.95	69.84
			0.00								
(3) DB980H90E-M w/Mount	B	From Leg	1.90			-20.0000	144.00	No Ice	4.27	3.86	34.05
Pipe			-0.70					1/2" Ice	4.86	4.95	69.84
			0.00								
(3) DB980H90E-M w/Mount	C	From Leg	1.90			-20.0000	144.00	No Ice	4.27	3.86	34.05
Pipe			-0.70					1/2" Ice	4.86	4.95	69.84
			0.00								
**											
6' Sidearm (Pipe) (VSI)	B	From Leg	3.00			0.0000	124.00	No Ice	3.30	5.00	125.00
			0.00					1/2" Ice	4.70	7.10	175.00
			0.00								
6' Sidearm (Pipe) (VSI)	A	From Leg	3.00			0.0000	124.00	No Ice	3.30	5.00	125.00
			0.00					1/2" Ice	4.70	7.10	175.00
			0.00								
DB809K-Y	B	From Leg	6.00			0.0000	124.00	No Ice	2.85	2.85	30.00
			0.00					1/2" Ice	4.03	4.03	51.23
			6.00								

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
DB809K-Y	A	From Leg	6.00 0.00 6.00	0.0000	124.00	No Ice 1/2" Ice	2.85 4.03	2.85 4.03	30.00 51.23
**									
6' Sidearm (Pipe) (VSI)	B	From Leg	3.00 0.00 0.00	0.0000	104.00	No Ice 1/2" Ice	3.30 4.70	5.00 7.10	125.00 175.00
6' Sidearm (Pipe) (VSI)	A	From Leg	3.00 0.00 0.00	0.0000	104.00	No Ice 1/2" Ice	3.30 4.70	5.00 7.10	125.00 175.00
DB810M-XC	B	From Leg	6.00 0.00 5.00	0.0000	104.00	No Ice 1/2" Ice	2.12 3.14	2.12 3.14	30.00 46.22
DB809K-Y	A	From Leg	6.00 0.00 3.00	0.0000	104.00	No Ice 1/2" Ice	2.85 4.03	2.85 4.03	30.00 51.23
**									
Pirod 12' T-Frame Sector Mount (1) (VSI)	A	From Leg	2.75 -1.00 0.00	-20.0000	95.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
Pirod 12' T-Frame Sector Mount (1) (VSI)	B	From Leg	2.75 -1.00 0.00	-20.0000	95.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
Pirod 12' T-Frame Sector Mount (1) (VSI)	C	From Leg	2.75 -1.00 0.00	-20.0000	95.00	No Ice 1/2" Ice	14.40 20.10	10.50 13.80	465.00 600.00
(4) DR85-17-02DPL2Q w/Mount Pipe	A	From Leg	4.75 -1.75 0.00	-20.0000	95.00	No Ice 1/2" Ice	6.89 7.59	4.09 5.15	49.55 97.07
(4) DR85-17-02DPL2Q w/Mount Pipe	B	From Leg	4.75 -1.75 0.00	-20.0000	95.00	No Ice 1/2" Ice	6.89 7.59	4.09 5.15	49.55 97.07
(4) DR85-17-02DPL2Q w/Mount Pipe	C	From Leg	4.75 -1.75 0.00	-20.0000	95.00	No Ice 1/2" Ice	6.89 7.59	4.09 5.15	49.55 97.07
**									
4' Side Arm	B	From Leg	2.00 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice	1.00 1.50	3.00 4.00	60.00 95.00
**									
4' Side Arm	B	From Leg	2.00 0.00 0.00	0.0000	42.00	No Ice 1/2" Ice	1.00 1.50	3.00 4.00	60.00 95.00

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Diagonal	A325N	0.6250	1	931.13	5437.50	0.171 ✔	1.333	Gusset Bearing
		Top Girt	A325N	0.6250	1	41.99	6442.72	0.007 ✔	1.333	Bolt Shear
T2	176	Diagonal	A325N	0.6250	1	2128.28	5437.50	0.391 ✔	1.333	Gusset Bearing
T3	172	Diagonal	A325N	0.6250	1	2626.19	5437.50	0.483 ✔	1.333	Gusset Bearing
T4	168	Diagonal	A325N	0.6250	1	2934.78	5437.50	0.540 ✔	1.333	Gusset Bearing
T5	164	Diagonal	A325N	0.6250	1	4297.92	5437.50	0.790 ✔	1.333	Gusset Bearing
T6	160	Diagonal	A325N	0.6250	1	6032.68	5437.50	1.109 ✔	1.333	Gusset Bearing
T7	140	Diagonal	A325N	0.6250	1	6653.36	5437.50	1.224 ✔	1.333	Gusset Bearing
T8	120	Diagonal	A325N	0.6250	1	6798.21	5437.50	1.250 ✔	1.333	Gusset Bearing
T9	113.333	Diagonal	A325N	0.6250	1	6636.58	5437.50	1.221 ✔	1.333	Gusset Bearing
T10	106.667	Diagonal	A325N	0.6250	1	7029.06	9062.50	0.776 ✔	1.333	Gusset Bearing
T11	100	Diagonal	A325N	0.6250	1	7167.89	5437.50	1.318 ✔	1.333	Gusset Bearing
T12	93.3333	Diagonal	A325N	0.6250	1	8208.03	9062.50	0.906 ✔	1.333	Gusset Bearing
T13	86.6667	Diagonal	A325N	0.6250	1	8339.93	9062.50	0.920 ✔	1.333	Gusset Bearing
T14	80	Diagonal	A325N	0.6250	1	9821.89	9062.50	1.084 ✔	1.333	Gusset Bearing
T15	60	Diagonal	A325N	0.6250	1	10283.50	9062.50	1.135 ✔	1.333	Gusset Bearing
T16	40	Diagonal	A325N	0.6250	1	10464.00	9062.50	1.155 ✔	1.333	Gusset Bearing
T17	30	Diagonal	A325N	0.6250	1	10591.80	9062.50	1.169 ✔	1.333	Gusset Bearing
T18	20	Diagonal	A325N	0.6250	1	11350.90	9062.50	1.253 ✔	1.333	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 176	P2x.154	4.00	4.00	61.0 K=1.00	16.934	1.0745	-3737.44	18195.60	0.205 ✔
T2	176 - 172	P2x.154	4.00	4.00	61.0 K=1.00	16.934	1.0745	-7480.12	18195.60	0.411 ✔
T3	172 - 168	P2x.154	4.00	4.00	61.0 K=1.00	16.934	1.0745	-14028.40	18195.60	0.771 ✔
T4	168 - 164	P2x.154	4.00	4.00	61.0 K=1.00	16.934	1.0745	-20923.30	18195.60	1.150 ✔
T5	164 - 160	P2x.154 w/ 2" Leg Reinforcement (VSI)	4.00	4.00	61.0 K=1.00	16.933	4.2161	-31571.60	71392.60	0.442 ✔
T6	160 - 140	P3x.216 w/ 2" Leg Reinforcement (VSI)	20.03	5.01	51.7 K=1.00	17.761	5.3701	-82681.50	95378.90	0.867 ✔
T7	140 - 120	P3.5x.318 w/ 2" Leg Reinforcement (VSI)	20.03	6.68	61.3 K=1.00	16.901	6.8196	-131699.00	115261.00	1.143

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T8	120 - 113.333	P4x.337 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	54.3 K=1.00	17.536	7.5486	-147377.00	132371.00	1.113 ✓
T9	113.333 - 106.667	P4x.337 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	54.3 K=1.00	17.536	7.5486	-162166.00	132371.00	1.225 ✓
T10	106.667 - 100	P4x.337 w/ 2" Leg Reinforcement (VSI) H1-3 (1.34 CR) - 117	6.68	6.68	54.3 K=1.00	17.536	7.5486	-176976.00	132371.00	1.337 ✗
T11	100 - 93.3333	P5x.375 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	43.6 K=1.00	18.423	9.2536	-192504.00	170481.00	1.129 ✓
T12	93.3333 - 86.6667	P5x.375 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	43.6 K=1.00	18.423	9.2536	-207246.00	170481.00	1.216 ✓
T13	86.6667 - 80	P5x.375 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	43.6 K=1.00	18.423	9.2536	-223919.00	170481.00	1.313 ✓
T14	80 - 60	P6x.432 w/ 2" Leg Reinforcement (VSI)	20.03	10.02	54.8 K=1.00	17.492	11.5465	-265626.00	201975.00	1.315 ✓
T15	60 - 40	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	20.03	10.02	54.8 K=1.00	17.492	14.3445	-310096.00	250918.00	1.236 ✓
T16	40 - 30	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	10.02	5.16	28.2 K=1.00	19.535	14.3445	-331707.00	280222.00	1.184 ✓
T17	30 - 20	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	10.02	5.15	28.2 K=1.00	19.538	14.3445	-352573.00	280267.00	1.258 ✓
T18	20 - 0	P8 x .5 w/ 2.75" Leg Reinforcement (VSI)	20.03	10.02	41.8 K=1.00	18.565	18.7023	-393472.00	347201.00	1.133 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 176	L2x1 1/2x3/16	4.63	2.32	86.3 K=1.00	14.634	0.6211	-887.85	9089.35	0.098 ✓
T2	176 - 172	L2x1 1/2x3/16	4.63	2.32	86.3 K=1.00	14.634	0.6211	-2203.86	9089.35	0.242 ✓
T3	172 - 168	L2x1 1/2x3/16	4.63	2.32	86.3 K=1.00	14.634	0.6211	-2675.46	9089.35	0.294 ✓
T4	168 - 164	L2x1 1/2x3/16	4.63	2.32	86.3 K=1.00	14.634	0.6211	-2984.79	9089.35	0.328 ✓
T5	164 - 160	L2x1 1/2x3/16	4.63	2.32	86.3 K=1.00	14.634	0.6211	-4439.60	9089.35	0.488 ✓
T6	160 - 140	L2x1 1/2x3/16	6.52	3.40	126.8 K=1.00	9.287	0.6211	-6042.71	5768.02	1.048 ✓
T7	140 - 120	L2x2x3/16	9.07	4.73	144.1 K=1.00	7.192	0.7150	-6842.29	5142.26	1.331 ✓
T8	120 - 113.333	L2 1/2x2x3/16	9.63	5.01	140.7 K=1.00	7.546	0.8090	-6922.55	6104.62	1.134 ✓
T9	113.333 - 106.667	L2 1/2x2x3/16	10.15	5.26	147.9 K=1.00	6.824	0.8090	-6912.41	5520.64	1.252 ✓
T10	106.667 - 100	2L2 1/2x2x3/16x1/4	10.69	5.53	172.8 K=1.00	5.003	1.6172	-7259.01	8090.85	0.897 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
		2L 'a' > 26.8204 in - 120								
T11	100 - 93.3333	L2 1/2x2 1/2x3/16	11.26	5.81	140.9 K=1.00	7.517	0.9020	-7204.11	6780.53	1.062 ✔
T12	93.3333 - 86.6667	2L2 1/2x2 1/2x3/16x1/4	11.82	6.09	161.2 K=1.00	5.746	1.8047	-8769.80	10369.00	0.846 ✔
		2L 'a' > 34.8620 in - 138								
T13	86.6667 - 80	2L2 1/2x2 1/2x3/16x1/4	12.40	6.37	168.6 K=1.00	5.251	1.8047	-8377.70	9475.91	0.884 ✔
		2L 'a' > 36.4835 in - 147								
T14	80 - 60	2L3x3x3/16x1/4	15.56	8.07	177.9 K=1.00	4.719	2.1797	-10206.50	10285.30	0.992 ✔
		2L 'a' > 46.0983 in - 156								
T15	60 - 40	2L3 1/2x3 1/2x1/4x1/4	17.20	8.88	168.4 K=1.00	5.266	3.3750	-10842.80	17774.40	0.610 ✔
		2L 'a' > 50.7868 in - 171								
T16	40 - 30	2L3 1/2x3 1/2x1/4x1/4	18.06	9.30	176.4 K=1.00	4.800	3.3750	-11166.40	16198.90	0.689 ✔
		2L 'a' > 53.2149 in - 186								
T17	30 - 20	2L3 1/2x3 1/2x1/4x1/4	18.77	9.65	183.0 K=1.00	4.458	3.3750	-12012.00	15045.60	0.798 ✔
		2L 'a' > 55.2127 in - 198								
T18	20 - 0	2L3 1/2x3 1/2x1/4x1/4	20.53	10.53	199.6 K=1.00	3.746	3.3750	-12658.00	12644.00	1.001 ✔
		2L 'a' > 60.2153 in - 213								

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T16	40 - 30	L3 1/2x3 1/2x1/4	16.48	16.48	285.0 K=1.00	1.838	1.6900	-1096.11	3106.16	0.353 ✔
		KL/R > 250 (C) - 190								
T17	30 - 20	L3 1/2x3 1/2x1/4	17.49	17.49	151.2 K=0.50	6.534	1.6900	-1023.52	11043.00	0.093 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 176	L2x2x3/16	4.00	4.00	121.8 K=1.00	10.019	0.7150	-41.99	7163.62	0.006 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 176	P2x.154	4.00	4.00	61.0	21.000	1.0745	2077.78	22565.20	0.092 ✓
T2	176 - 172	P2x.154	4.00	4.00	61.0	21.000	1.0745	5588.36	22565.20	0.248 ✓
T3	172 - 168	P2x.154	4.00	4.00	61.0	21.000	1.0745	11207.30	22565.20	0.497 ✓
T4	168 - 164	P2x.154	4.00	4.00	61.0	21.000	1.0745	17022.50	22565.20	0.754 ✓
T5	164 - 160	P2x.154 w/ 2" Leg Reinforcement (VSI)	4.00	4.00	61.0	21.000	4.2161	24952.00	88538.00	0.282 ✓
T6	160 - 140	P3x.216 w/ 2" Leg Reinforcement (VSI)	20.03	5.01	51.7	21.000	5.3701	67380.50	112772.00	0.597 ✓
T7	140 - 120	P3.5x.318 w/ 2" Leg Reinforcement (VSI)	20.03	6.68	61.3	21.000	6.8196	108900.00	143211.00	0.760 ✓
T8	120 - 113.333	P4x.337 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	54.3	21.000	7.5486	121883.00	158520.00	0.769 ✓
T9	113.333 - 106.667	P4x.337 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	54.3	21.000	7.5486	134111.00	158520.00	0.846 ✓
T10	106.667 - 100	P4x.337 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	54.3	21.000	7.5486	145814.00	158520.00	0.920 ✓
T11	100 - 93.3333	P5x.375 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	43.6	21.000	9.2536	157196.00	194325.00	0.809 ✓
T12	93.3333 - 86.6667	P5x.375 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	43.6	21.000	9.2536	167962.00	194325.00	0.864 ✓
T13	86.6667 - 80	P5x.375 w/ 2" Leg Reinforcement (VSI)	6.68	6.68	43.6	21.000	9.2536	180474.00	194325.00	0.929 ✓
T14	80 - 60	P6x.432 w/ 2" Leg Reinforcement (VSI)	20.03	10.02	54.8	21.000	11.5465	211585.00	242476.00	0.873 ✓
T15	60 - 40	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	20.03	10.02	54.8	21.000	14.3445	242990.00	301234.00	0.807 ✓
T16	40 - 30	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	10.02	5.16	28.2	21.000	14.3445	257721.00	301234.00	0.856 ✓
T17	30 - 20	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	10.02	5.15	28.2	21.000	14.3445	271651.00	301234.00	0.902 ✓
T18	20 - 0	P8 x .5 w/ 2.75" Leg Reinforcement (VSI)	20.03	10.02	41.8	21.000	18.7023	299275.00	392748.00	0.762 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 176	L2x1 1/2x3/16	4.63	2.32	63.2	29.000	0.3604	931.13	10450.20	0.089 ✓
T2	176 - 172	L2x1 1/2x3/16	4.63	2.32	63.2	29.000	0.3604	2128.28	10450.20	0.204

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	172 - 168	L2x1 1/2x3/16	4.63	2.32	63.2	29.000	0.3604	2626.19	10450.20	0.251
T4	168 - 164	L2x1 1/2x3/16	4.63	2.32	63.2	29.000	0.3604	2934.78	10450.20	0.281
T5	164 - 160	L2x1 1/2x3/16	4.63	2.32	63.2	29.000	0.3604	4297.92	10450.20	0.411
T6	160 - 140	L2x1 1/2x3/16	6.52	3.40	92.9	29.000	0.3604	6032.68	10450.20	0.577
T7	140 - 120	L2x2x3/16	8.11	4.27	83.0	29.000	0.4308	6653.36	12492.70	0.533
T8	120 - 113.333	L2 1/2x2x3/16	9.63	5.01	100.2	29.000	0.5013	6798.21	14537.20	0.468
T9	113.333 - 106.667	L2 1/2x2x3/16	10.15	5.26	105.3	29.000	0.5013	6636.58	14537.20	0.457
T10	106.667 - 100	2L2 1/2x2x3/16x1/4	10.69	5.53	83.7	29.000	1.0020	7029.06	29056.60	0.242
T11	100 - 93.3333	2L 'a' > 26.8204 in - 121 L2 1/2x2 1/2x3/16	11.26	5.81	89.7	29.000	0.5710	7167.89	16559.90	0.433
T12	93.3333 - 86.6667	2L2 1/2x2 1/2x3/16x1/4	11.82	6.09	93.9	29.000	1.1426	8208.03	33134.80	0.248
T13	86.6667 - 80	2L 'a' > 34.8620 in - 139 2L2 1/2x2 1/2x3/16x1/4	12.40	6.37	98.3	29.000	1.1426	8339.93	33134.80	0.252
T14	80 - 60	2L 'a' > 36.4835 in - 148 2L3x3x3/16x1/4	15.56	8.07	103.1	29.000	1.4238	9821.89	41291.00	0.238
T15	60 - 40	2L 'a' > 46.0983 in - 157 2L3 1/2x3 1/2x1/4x1/4	17.20	8.88	97.6	29.000	2.2500	10283.50	65250.00	0.158
T16	40 - 30	2L 'a' > 50.7868 in - 172 2L3 1/2x3 1/2x1/4x1/4	18.06	9.30	102.3	29.000	2.2500	10464.00	65250.00	0.160
T17	30 - 20	2L 'a' > 53.2149 in - 187 2L3 1/2x3 1/2x1/4x1/4	18.77	9.65	106.1	29.000	2.2500	10591.80	65250.00	0.162
T18	20 - 0	2L 'a' > 55.2127 in - 199 2L3 1/2x3 1/2x1/4x1/4 2L 'a' > 57.6963 in - 218	19.64	10.09	110.9	29.000	2.2500	11350.90	65250.00	0.174

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T16	40 - 30	L3 1/2x3 1/2x1/4	16.48	16.48	181.5	21.600	1.6900	1191.67	36504.00	0.033
T17	30 - 20	L3 1/2x3 1/2x1/4	17.49	17.49	192.5	21.600	1.6900	1128.11	36504.00	0.031

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	lb	lb	

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	lb	lb	
T1	180 - 176	L2x2x3/16	4.00	4.00	77.8	29.000	0.4308	4.67	12492.70	0.000* ✓

* DL controls

Section Capacity Table

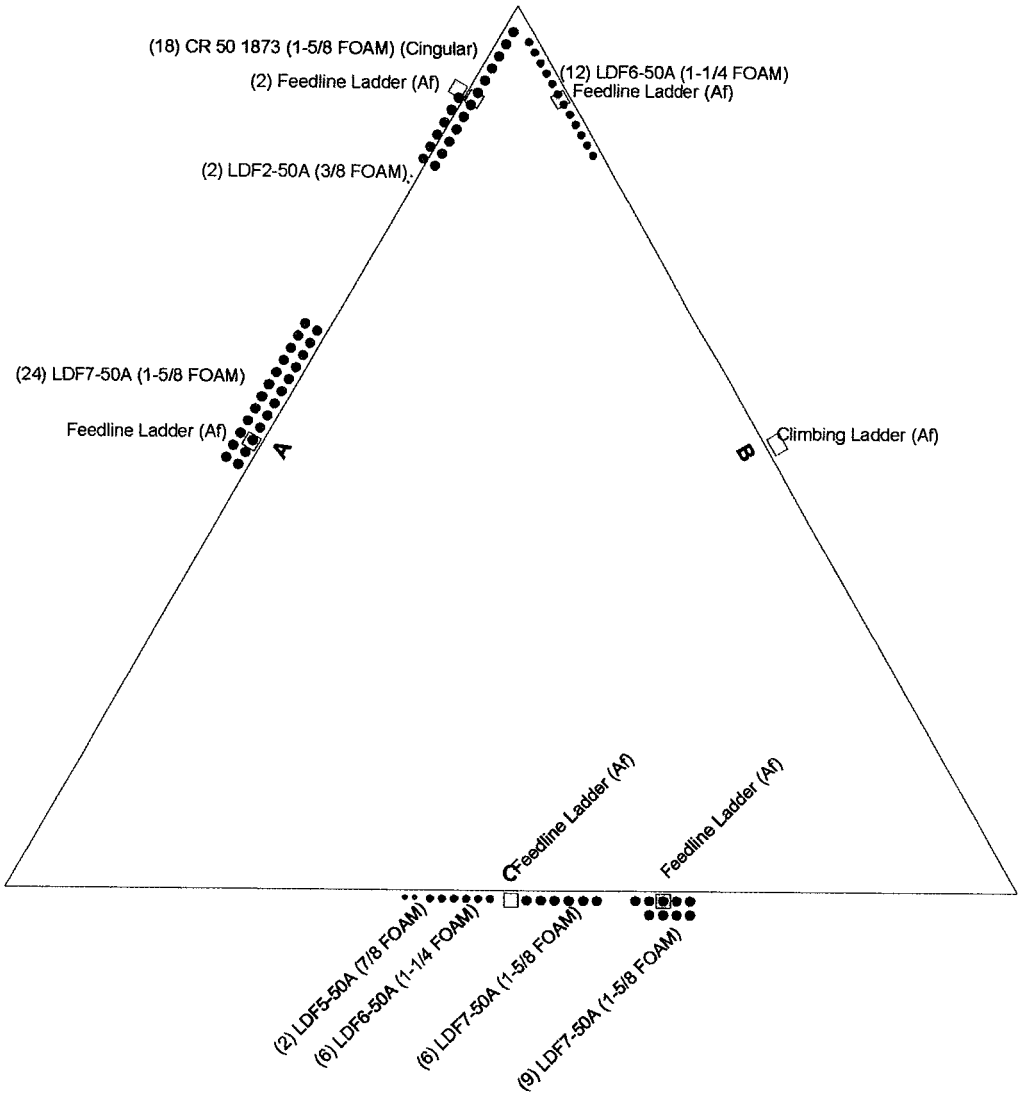
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	180 - 176	Leg	P2x.154	3	-3737.44	24254.73	15.4	Pass
		Diagonal	L2x1 1/2x3/16	12	-887.85	12116.10	7.3	Pass
							12.8 (b)	
		Top Girt	L2x2x3/16	5	-41.99	9549.11	0.4	Pass
							0.5 (b)	
T2	176 - 172	Leg	P2x.154	15	-7480.12	24254.73	30.8	Pass
		Diagonal	L2x1 1/2x3/16	20	-2203.86	12116.10	18.2	Pass
							29.4 (b)	
T3	172 - 168	Leg	P2x.154	24	-14028.40	24254.73	57.8	Pass
		Diagonal	L2x1 1/2x3/16	27	-2675.46	12116.10	22.1	Pass
							36.2 (b)	
T4	168 - 164	Leg	P2x.154	33	-20923.30	24254.73	86.3	Pass
		Diagonal	L2x1 1/2x3/16	37	-2984.79	12116.10	24.6	Pass
							40.5 (b)	
T5	164 - 160	Leg	P2x.154 w/ 2" Leg Reinforcement (VSI)	42	-31571.60	95166.33	33.2	Pass
		Diagonal	L2x1 1/2x3/16	45	-4439.60	12116.10	36.6	Pass
							59.3 (b)	
T6	160 - 140	Leg	P3x.216 w/ 2" Leg Reinforcement (VSI)	51	-82681.50	127140.07	65.0	Pass
		Diagonal	L2x1 1/2x3/16	54	-6042.71	7688.77	78.6	Pass
							83.2 (b)	
T7	140 - 120	Leg	P3.5x.318 w/ 2" Leg Reinforcement (VSI)	78	-131699.00	153642.91	85.7	Pass
		Diagonal	L2x2x3/16	81	-6842.29	6854.63	99.8	Pass
T8	120 - 113.333	Leg	P4x.337 w/ 2" Leg Reinforcement (VSI)	99	-147377.00	176450.54	83.5	Pass
		Diagonal	L2 1/2x2x3/16	102	-6922.55	8137.46	85.1	Pass
							93.8 (b)	
T9	113.333 - 106.667	Leg	P4x.337 w/ 2" Leg Reinforcement (VSI)	108	-162166.00	176450.54	91.9	Pass
		Diagonal	L2 1/2x2x3/16	111	-6912.41	7359.01	93.9	Pass
T10	106.667 - 100	Leg	P4x.337 w/ 2" Leg Reinforcement (VSI)	117	-176976.00	176450.54	100.3	Fail ✗
		Diagonal	2L2 1/2x2x3/16x1/4	120	-7259.01	10785.10	67.3	Pass
T11	100 - 93.3333	Leg	P5x.375 w/ 2" Leg	126	-192504.00	227251.16	84.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
			Reinforcement (VSI)					
		Diagonal	L2 1/2x2 1/2x3/16	129	-7204.11	9038.45	79.7	Pass
							98.9 (b)	
T12	93.3333 - 86.6667	Leg	P5x.375 w/ 2" Leg Reinforcement (VSI)	135	-207246.00	227251.16	91.2	Pass
		Diagonal	2L2 1/2x2 1/2x3/16x1/4	138	-8769.80	13821.88	63.4	Pass
							67.9 (b)	
T13	86.6667 - 80	Leg	P5x.375 w/ 2" Leg Reinforcement (VSI)	144	-223919.00	227251.16	98.5	Pass
		Diagonal	2L2 1/2x2 1/2x3/16x1/4	147	-8377.70	12631.39	66.3	Pass
							69.0 (b)	
T14	80 - 60	Leg	P6x.432 w/ 2" Leg Reinforcement (VSI)	153	-265626.00	269232.66	98.7	Pass
		Diagonal	2L3x3x3/16x1/4	156	-10206.50	13710.30	74.4	Pass
							81.3 (b)	
T15	60 - 40	Leg	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	168	-310096.00	334473.68	92.7	Pass
		Diagonal	2L3 1/2x3 1/2x1/4x1/4	171	-10842.80	23693.27	45.8	Pass
							85.1 (b)	
T16	40 - 30	Leg	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	183	-331707.00	373535.91	88.8	Pass
		Diagonal	2L3 1/2x3 1/2x1/4x1/4	186	-11166.40	21593.13	51.7	Pass
							86.6 (b)	
		Secondary Horizontal	L3 1/2x3 1/2x1/4	190	-1096.11	4140.51	26.5	Pass
T17	30 - 20	Leg	P6x.432 w/ 2.75" Leg Reinforcement (VSI)	195	-352573.00	373595.90	94.4	Pass
		Diagonal	2L3 1/2x3 1/2x1/4x1/4	198	-12012.00	20055.78	59.9	Pass
							87.7 (b)	
		Secondary Horizontal	L3 1/2x3 1/2x1/4	202	-1023.52	14720.32	7.0	Pass
T18	20 - 0	Leg	P8 x .5 w/ 2.75" Leg Reinforcement (VSI)	207	-393472.00	462818.91	85.0	Pass
		Diagonal	2L3 1/2x3 1/2x1/4x1/4	213	-12658.00	16854.45	75.1	Pass
							94.0 (b)	
							Summary	
						Leg (T10)	100.3	Fail X
						Diagonal (T7)	99.8	Pass
						Secondary Horizontal (T16)	26.5	Pass
						Top Girt (T1)	0.5	Pass
						Bolt Checks	98.9	Pass
						RATING =	100.3	Fail X

APPENDIX B

Feedline Plan
20'

Section @ 20'



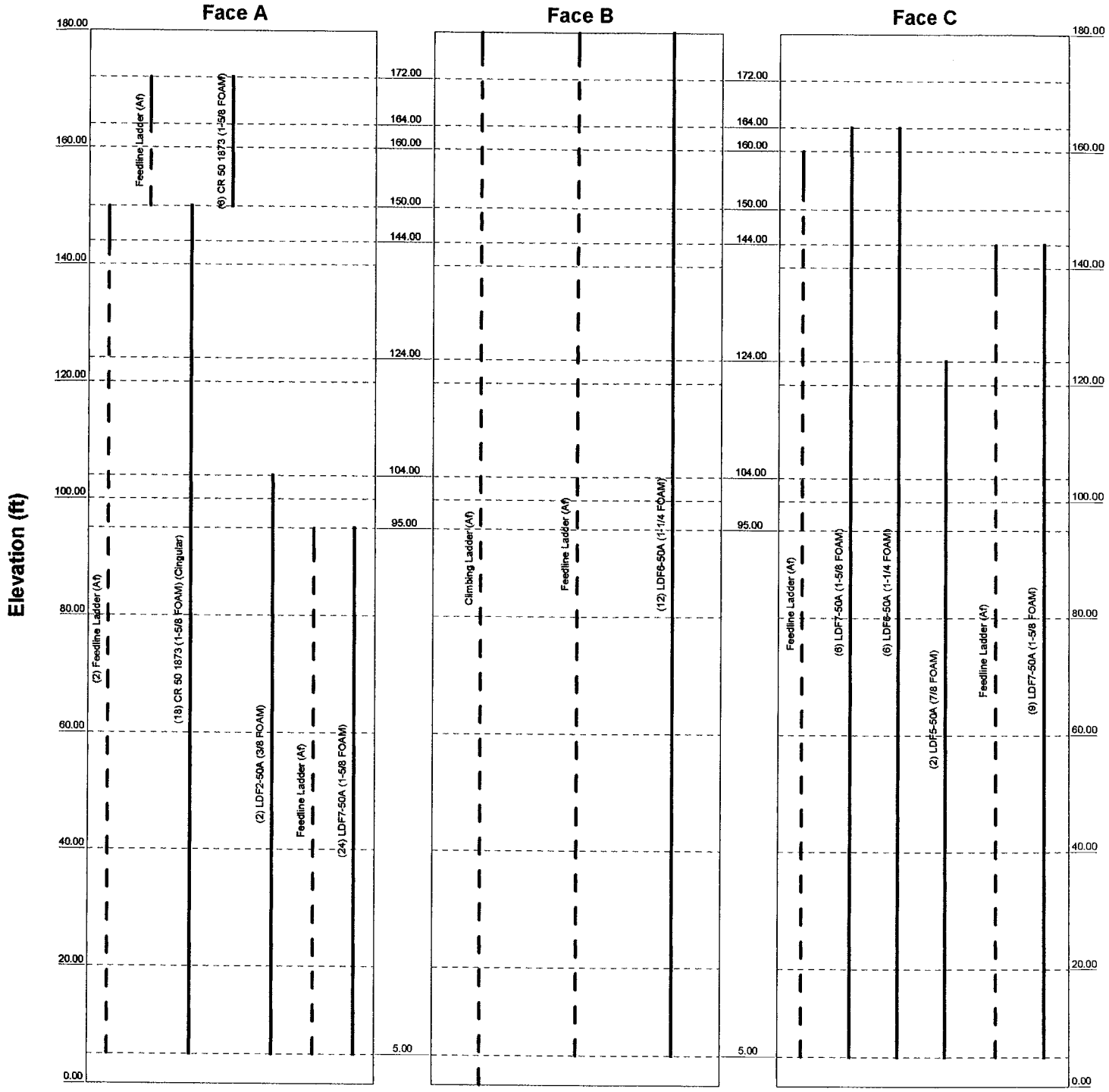
Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job:	***BRG 124, CT BU#806353***		
Project:	***Vertical Structures Job No. 2005-004-092***		
Client: Crown Castle		Drawn by: Kyle Meehan	App'd:
Code: TIA/EIA-222-F		Date: 12/09/05	Scale: NTS
Path:			Dwg No. E-7

Feedline Distribution Chart

0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



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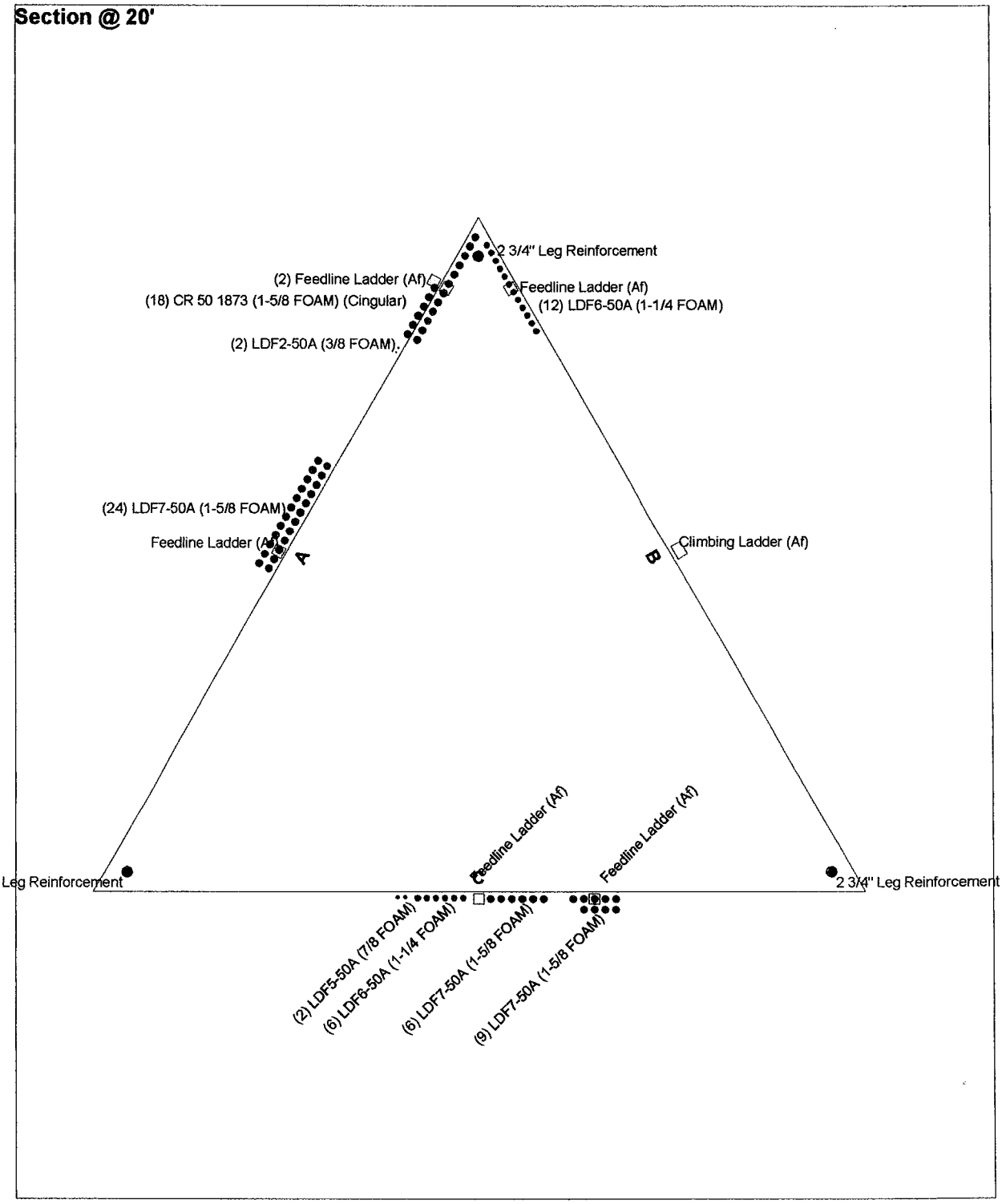
Feedline Plan
20'



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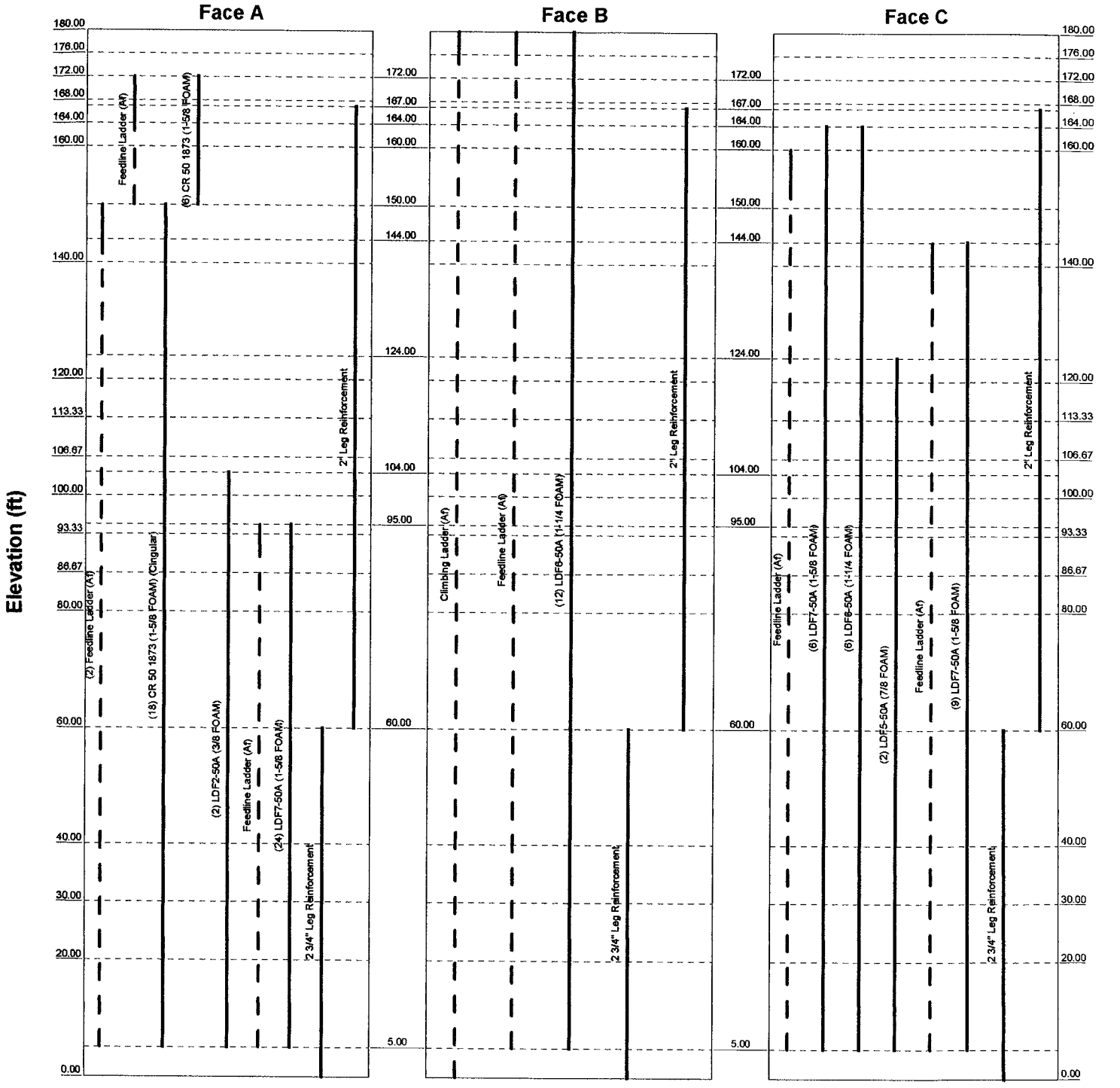
Project: ***Vertical Structures Job No. 2005-004-092***			
Client: Crown Castle	Drawn by: Kyle Meehan	App'd:	
Code: TIA/EIA-222-F	Date: 12/09/05	Scale: NTS	
Path:		Dwg No. E-7	

Feedline Distribution Chart

0' - 180'

Round — Flat — App In Face — App Out Face — Truss Leg



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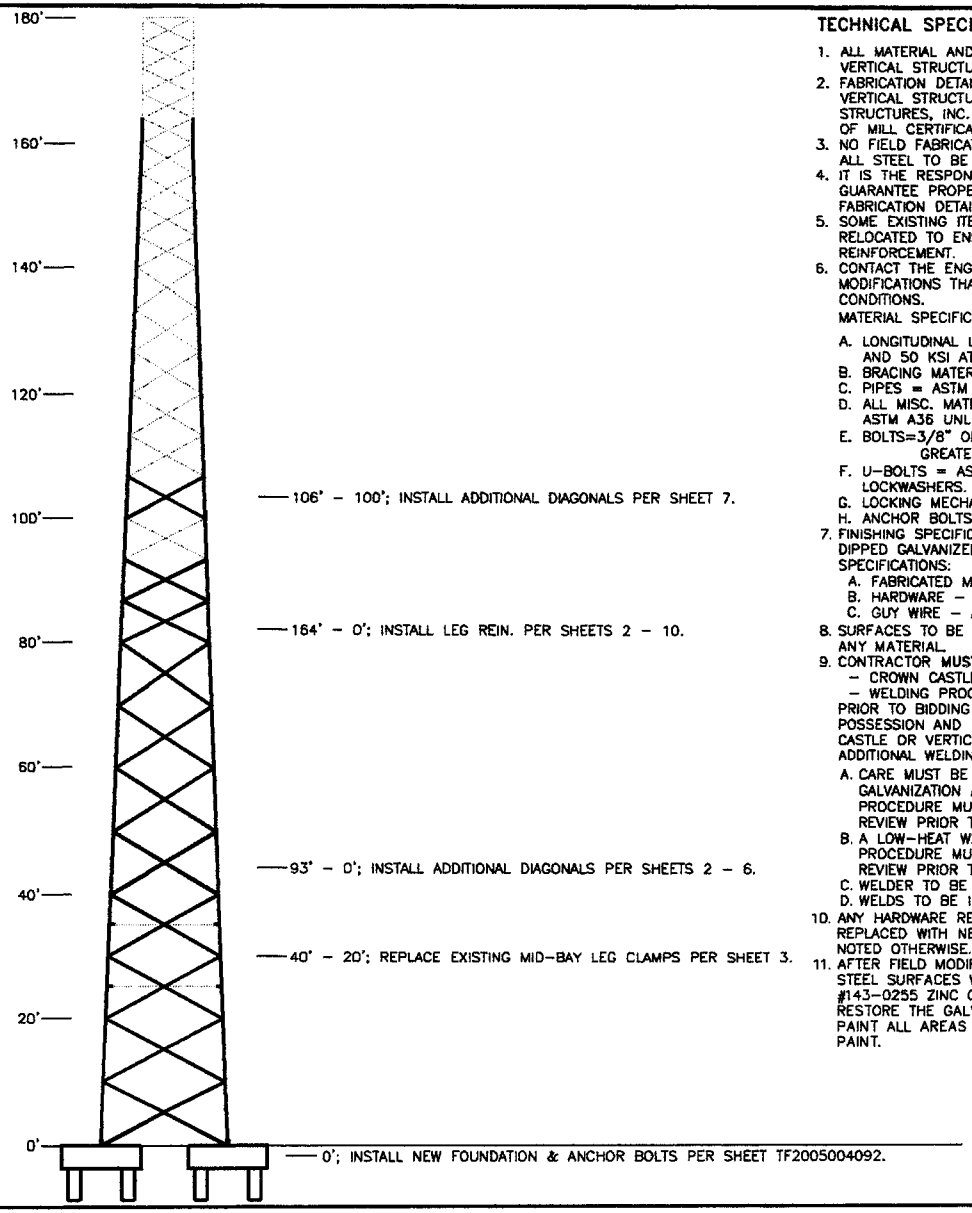
Code: TIA/EIA-222-F	Date: 12/09/05	Scale: NTS
Path:		Dwg No. E-7

APPENDIX C



TECHNICAL SPECIFICATION NOTES:

1. ALL MATERIAL AND HARDWARE CAN BE PURCHASED FROM VERTICAL STRUCTURES, INC.
2. FABRICATION DETAILS FOR ANY PARTS NOT PURCHASED FROM VERTICAL STRUCTURES, INC. MUST BE APPROVED BY VERTICAL STRUCTURES, INC. BEFORE USE. REVIEW MAY INCLUDE RECEIPT OF MILL CERTIFICATIONS WHEN NECESSARY.
3. NO FIELD FABRICATION OF TOWER REWORK MATERIAL IS ALLOWED. ALL STEEL TO BE SHOP FABRICATED.
4. IT IS THE RESPONSIBILITY OF THE MATERIAL SUPPLIER TO GUARANTEE PROPER FITUP. ALL DIMENSIONS USED IN FABRICATION DETAILS MUST BE FIELD VERIFIED.
5. SOME EXISTING ITEMS MAY NEED TO BE REMOVED AND RELOCATED TO ENSURE PROPER INSTALLATION OF REINFORCEMENT.
6. CONTACT THE ENGINEER CONCERNING ANY CHANGES OR MODIFICATIONS THAT MAY BE REQUIRED DUE TO THE EXISTING CONDITIONS.

   MATERIAL SPECIFICATIONS (WHEN APPLICABLE):

   A. LONGITUDINAL LEG REINFORCEMENT = 50 KSI ROD AND 50 KSI ATTACHMENT PIECES.
   B. BRACING MATERIAL = ASTM A36
   C. PIPES = ASTM A53-B
   D. ALL MISC. MATERIAL E.G. SHIM PLATES, BUSHINGS, ETC... WILL BE ASTM A36 UNLESS NOTED OTHERWISE.
   E. BOLTS=3/8" OR LESS SAE GRADE 5 W/ H OR 2H NUTS
      GREATER THAN 3/8" ASTM A325 W/ 2H NUTS
   F. U-BOLTS = ASTM 193 GRADE B7 W/ 2- 2H NUTS & 2- LOCKWASHERS.
   G. LOCKING MECHANISMS FOR BOLTS = PALNUT OR LOCKWASHERS.
   H. ANCHOR BOLTS = 50 KSI

7. FINISHING SPECIFICATIONS – ALL MATERIAL TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:
   A. FABRICATED MATERIAL – ASTM A123.
   B. HARDWARE – ASTM A153.
   C. GUY WIRE – ASTM A475.
8. SURFACES TO BE CLEARED OF GALVANIZATION BEFORE FIELD WELDING ANY MATERIAL.
9. CONTRACTOR MUST CONFORM TO THE FOLLOWING DOCUMENTS:
   – CROWN CASTLE CCUSA, SAFETY GUIDELINES FOR FIELD WELDING.
   – WELDING PROCESSES AND THEIR USE ON GALVANIZED TOWERS.
   PRIOR TO BIDDING REWORK CONTRACTOR MUST HAVE IN THEIR POSSESSION AND HAVE READ THESE DOCUMENTS. CONSULT CROWN CASTLE OR VERTICAL STRUCTURES FOR COPIES OF THESE DOCUMENTS.
   ADDITIONAL WELDING NOTES:
   A. CARE MUST BE TAKEN TO ENSURE THAT THE COAX AND GALVANIZATION ARE NOT DAMAGED BY HEAT DURING WELDING. PROCEDURE MUST BE SUBMITTED TO VERTICAL STRUCTURES FOR REVIEW PRIOR TO CONSTRUCTION.
   B. A LOW-HEAT WELDING PROCEDURE SHOULD BE EMPLOYED. PROCEDURE MUST BE SUBMITTED TO VERTICAL STRUCTURES FOR REVIEW PRIOR TO CONSTRUCTION.
   C. WELDER TO BE AWS CERTIFIED. USE E80XX RODS.
   D. WELDS TO BE INSPECTED BY AN AWS CERTIFIED INSPECTOR.
10. ANY HARDWARE REMOVED FROM THE EXISTING TOWER MUST BE REPLACED WITH NEW HARDWARE OF EQUAL SIZE AND QUALITY UNLESS NOTED OTHERWISE.
11. AFTER FIELD MODIFICATIONS OF ANY STEEL MEMBERS, COAT EXPOSED STEEL SURFACES WITH TWO COATS OF SHERWIN WILLIAMS PART #143-0255 ZINC CLAD COATING, CONTAINING 97% ZINC DUST TO RESTORE THE GALVANIZED PROTECTION ON THE MEMBERS. IF REQUIRED, PAINT ALL AREAS AFFECTED OR NEW STEEL WITH MATCHING TOWER PAINT.

TABLE OF CONTENTS

STRUCTURAL MODIFICATIONS:

THIS DRAWING DEPICTS THE REWORK REQUIRED TO REMEDY THE DEFICIENCIES FOUND IN THE BRG 124, CT TOWER PER THE REPORT PUBLISHED BY VERTICAL STRUCTURES ON 12-8-05, JOB# 2005-004-092.

A MINIMUM OF 264 FIELD DRILLED HOLES ARE REQUIRED FOR THESE MODIFICATIONS. HOLES MUST HAVE TWO COATS OF ZINC RICH PAINT PER NOTE 11 BEFORE ASSEMBLY

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40478
Phone: (859) 624-9380
Fax: (859) 624-9369
Email: engineering@verticalstructures.com

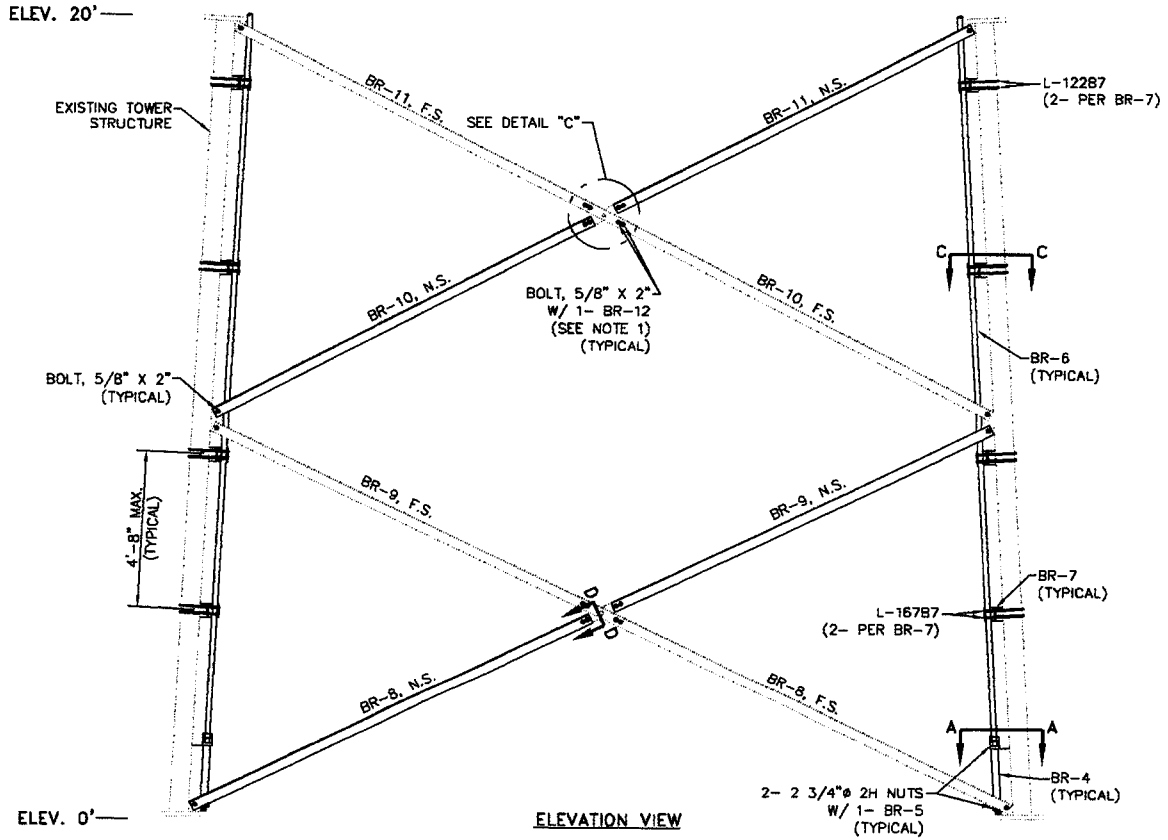
FDR

CROWN CASTLE

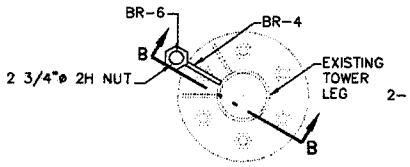
2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

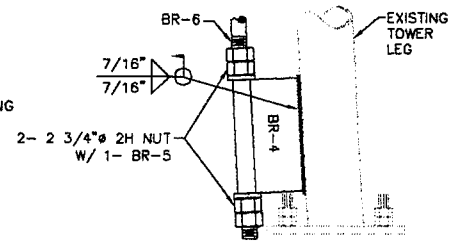
SHEET 1 OF 11	B TA2005004092-T1	SCALE: NONE



ELEVATION VIEW



SECTION "A-A"

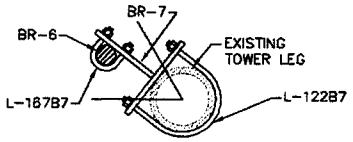


SECTION "B-B"

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-4	3	BULKHEAD WELDMENT, FOR A 2 3/4"ø S.R.
BR-5	6	PLATE WASHER, 3/4" THICK
BR-6	3	ROD REINFORCEMENT, 2 3/4"ø S.R.
BR-7	12	ATTACHMENT WELDMENT
BR-8	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-9	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-10	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-11	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-12	24	SPACER PLATE, 1/4" THICK
L-122B7	24	UBOLT, 1/2"ø FOR A B 5/8" O.D. PIPE
L-167B7	24	UBOLT, 1/2"ø FOR A 2 3/4" S.R.
XX5B20	72	BOLT, 5/8" X 2"
-	12	2H NUT, 2 3/4"ø

NOTES:

1. 48- 11/16"ø FIELD DRILLED HOLES REQUIRED. FIELD DRILLED HOLES TO BE DRILLED ON EXISTING BOLT HOLE GAUGE LINES.



SECTION "C-C"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1498
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

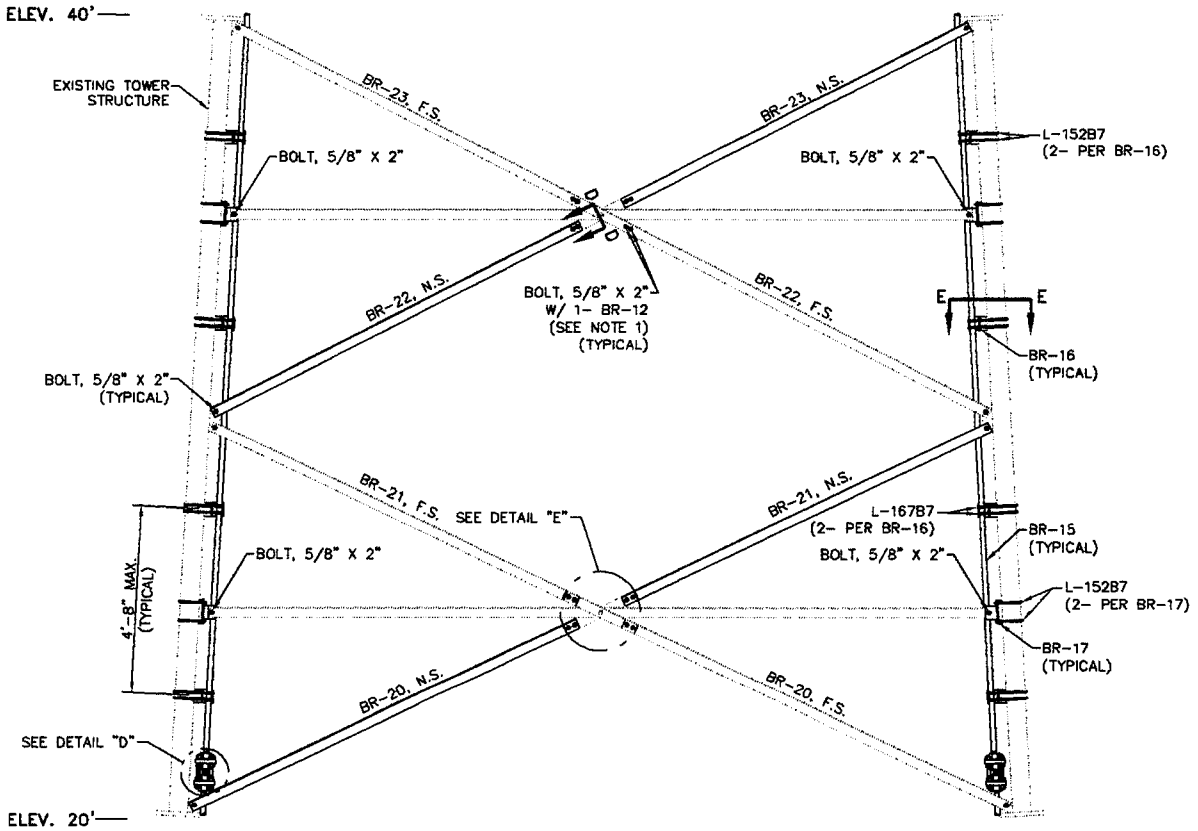
FOR

CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

SHEET 2 OF 11 | B TA2005004092-T2 | SCALE: NONE

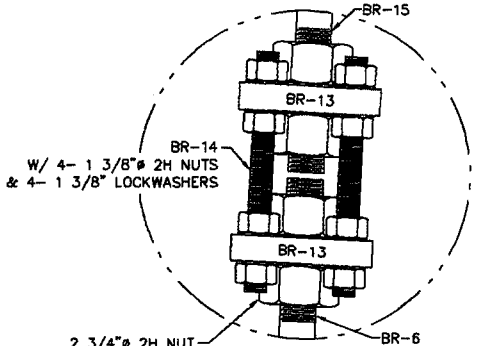


ELEVATION VIEW

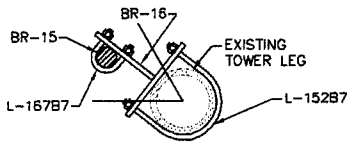
BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-12	24	SPACER PLATE, 1/4" THICK
BR-13	6	ATTACHMENT PLATE, 1 1/2" THICK
BR-14	12	ALLTHREAD, 1 3/8"ø W/ HARDWARE
BR-15	3	ROD REINFORCEMENT, 2 3/4"ø S.R.
BR-16	12	ATTACHMENT WELDMENT
BR-17	6	LUG WELDMENT, FOR A 6 5/8" O.D. PIPE
BR-20	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-21	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-22	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-23	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
L-152B7	30	UBOLT, 1/2"ø FOR A 6 5/8" O.D. PIPE
L-167B7	24	UBOLT, 1/2"ø FOR A 2 3/4" S.R.
XX5820	84	BOLT, 5/8" X 2"
–	12	2H NUT, 2 3/4"ø
–	12	LOCKWASHER, 2 3/4"ø

NOTES:

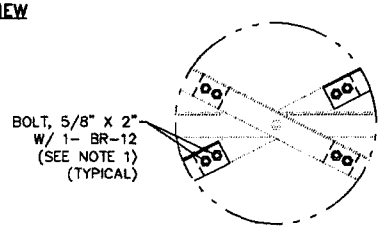
1. 48- 11/16"ø FIELD DRILLED HOLES REQUIRED. FIELD DRILLED HOLES TO BE DRILLED ON EXISTING BOLT HOLE GAUGE LINES.



DETAIL "D"



SECTION "E-E"



DETAIL "E"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

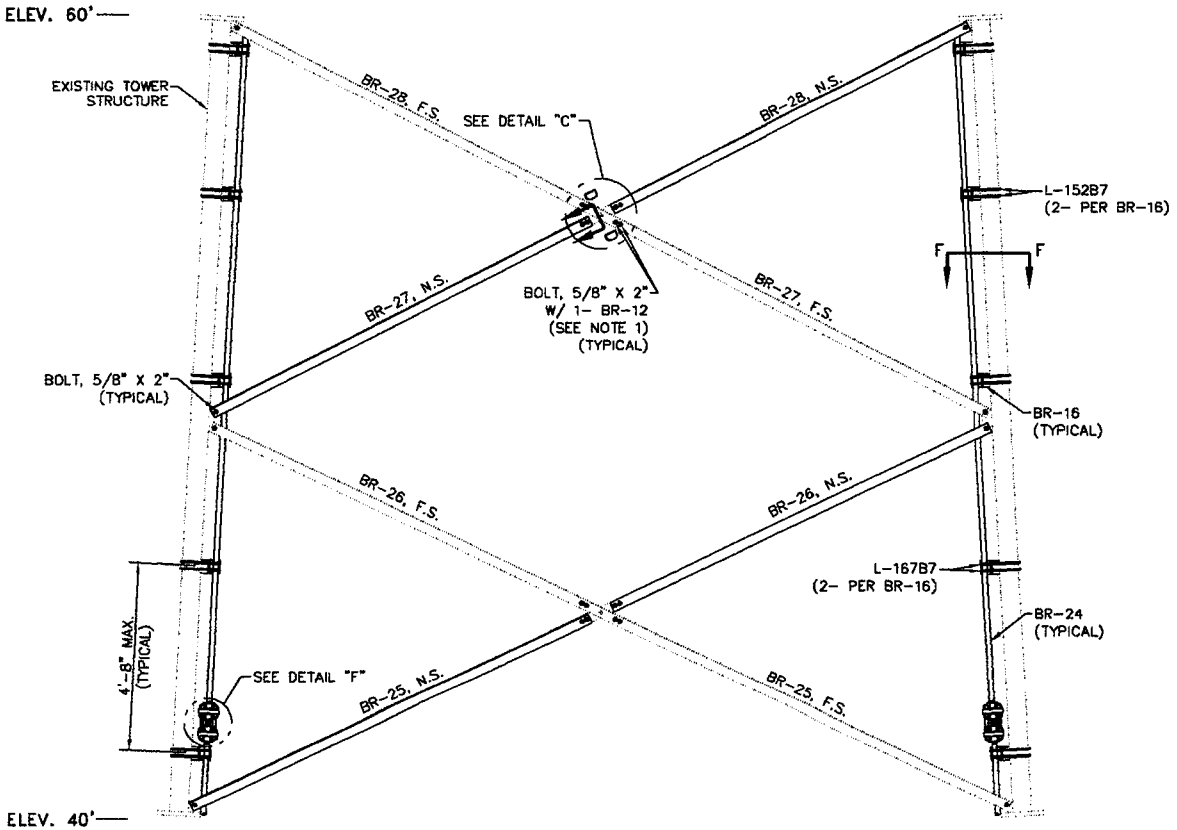
VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

FOR

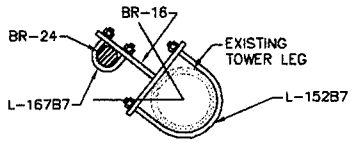
CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353			
DRAFTSPERSON: S. BURNETT	DATE 12-7-05	SHEET 3 OF 11	B TA2005004092-T3	SCALE: NONE
CHK'D BY:	DATE			
ENGR:	DATE			



ELEVATION VIEW

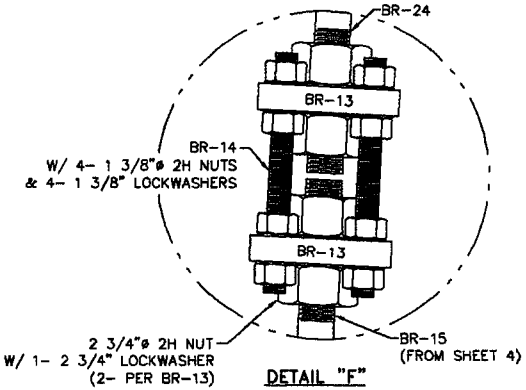


SECTION "F-F"

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-12	24	SPACER PLATE, 1/4" THICK
BR-13	6	ATTACHMENT PLATE, 1 1/2" THICK
BR-14	12	ALLTHREAD, 1 3/8"ø W/ HARDWARE
BR-16	15	ATTACHMENT WELDMENT
BR-24	3	ROD REINFORCEMENT, 2 3/4"ø S.R.
BR-25	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-26	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-27	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
BR-28	6	DIAGONAL, L 3 1/2" X 3 1/2" X 1/4"
L-152B7	30	UBOLT, 1/2"ø FOR A 6 5/8" O.D. PIPE
L-167B7	30	UBOLT, 1/2"ø FOR A 2 3/4" S.R.
XX5B20	72	BOLT, 5/8" X 2"
–	12	2H NUT, 2 3/4"ø
–	12	LOCKWASHER, 2 3/4"ø

NOTES:

1. 48– 11/16"ø FIELD DRILLED HOLES REQUIRED. FIELD DRILLED HOLES TO BE DRILLED ON EXISTING BOLT HOLE GAUGE LINES.



DETAIL "F"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

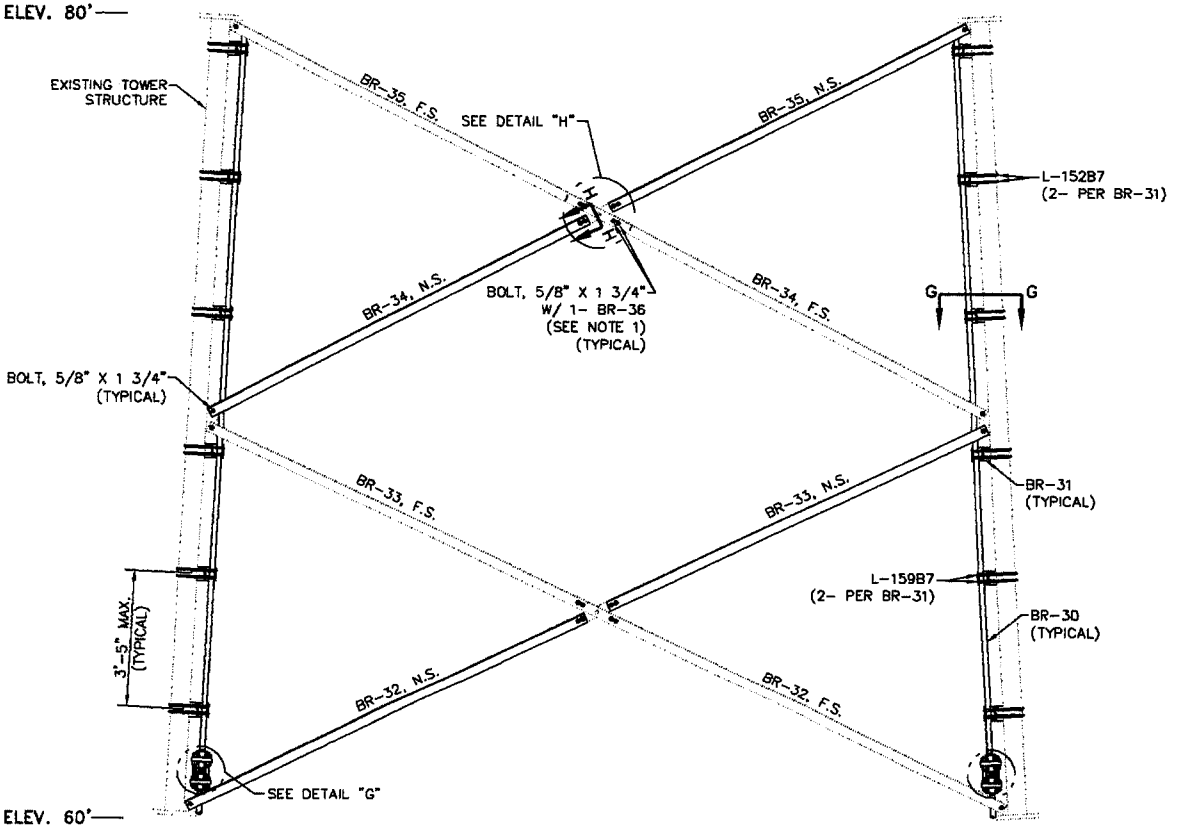
VERTICAL STRUCTURES INC.
P.O. Box 1498
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

FOR

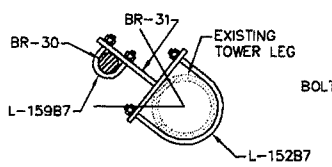
CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

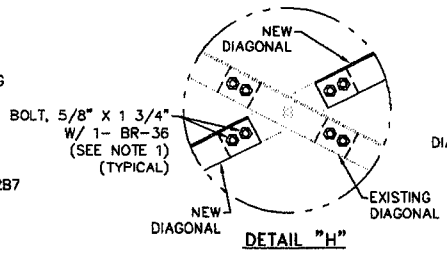
CROWN CASTLE BU# 806353			
DRAFTSPERSON: S. BURNETT	DATE 12-7-05		
CHK'D BY:	DATE		
ENGR:	DATE		
SHEET 4 OF 11	B TA2005004092-T4	SCALE: NONE	



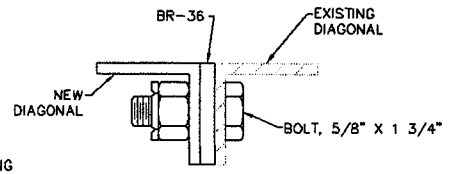
ELEVATION VIEW



SECTION "G-G"



DETAIL "H"

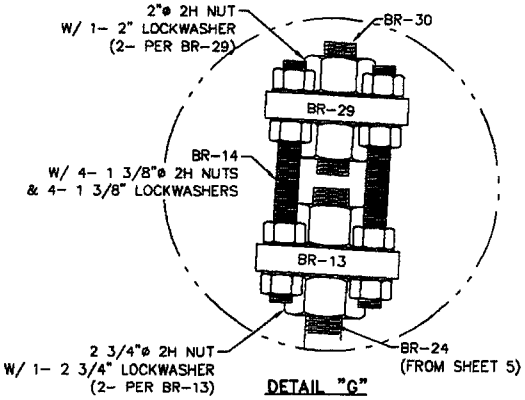


SECTION "H-H"

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-13	3	ATTACHMENT PLATE, 1 1/2" THICK
BR-14	12	ALLTHREAD, 1 3/8"ø W/ HARDWARE
BR-29	3	ATTACHMENT PLATE, 1 1/2" THICK
BR-30	3	ROD REINFORCEMENT, 2"ø S.R.
BR-31	18	ATTACHMENT WELDMENT
BR-32	6	DIAGONAL, L 3" X 3" X 3/16"
BR-33	6	DIAGONAL, L 3" X 3" X 3/16"
BR-34	6	DIAGONAL, L 3" X 3" X 3/16"
BR-35	6	DIAGONAL, L 3" X 3" X 3/16"
BR-36	24	SPACER PLATE, 1/4" THICK
L-152B7	36	UBOLT, 1/2"ø FOR A 6 5/8" O.D. PIPE
L-159B7	36	UBOLT, 1/2"ø FOR A 2" S.R.
XX5816	72	BOLT, 5/8" X 1 3/4"
–	6	2H NUT, 2"ø
–	6	LOCKWASHER, 2"ø
–	6	2H NUT, 2 3/4"ø
–	6	LOCKWASHER, 2 3/4"ø

NOTES:

1. 48- 11/16"ø FIELD DRILLED HOLES REQUIRED. FIELD DRILLED HOLES TO BE DRILLED ON EXISTING BOLT HOLE GAUGE LINES.



DETAIL "G"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

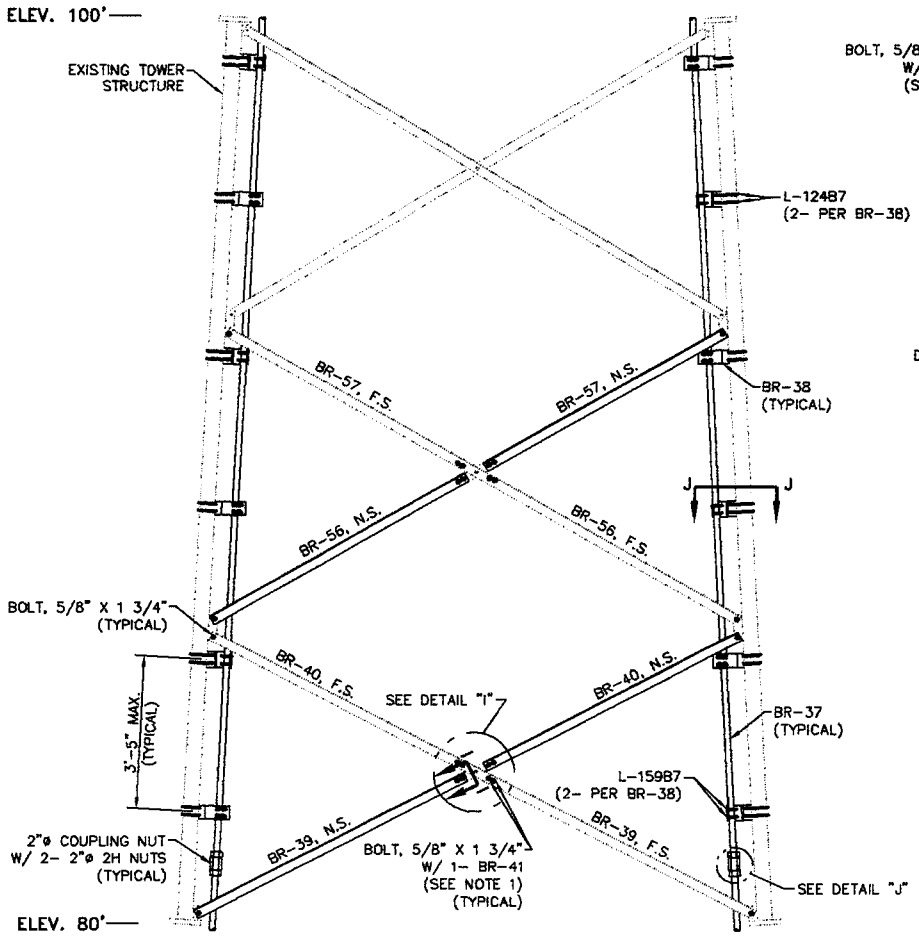
FOR

CROWN CASTLE

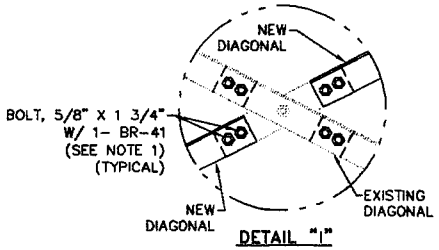
2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

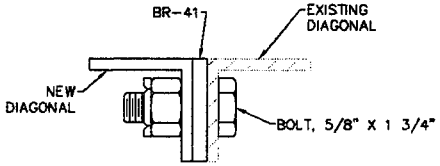
SHEET 5 OF 11 | B TA2005004092-T5 | SCALE: NONE



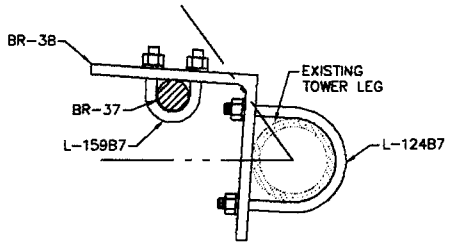
ELEVATION VIEW



DETAIL "I"



SECTION "I-I"



SECTION "J-J"

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-37	3	LEG REINFORCEMENT, 2"ø S.R.
BR-38	18	CLIP ANGLE, L 8" X 8" X 1/2"
BR-39	6	DIAGONAL, L 2 1/2" X 2 1/2" X 3/16"
BR-40	6	DIAGONAL, L 2 1/2" X 2 1/2" X 3/16"
BR-41	24	SPACER PLATE, 1/4" THICK
BR-56	6	DIAGONAL, L 2 1/2" X 2 1/2" X 3/16"
BR-57	6	DIAGONAL, L 2 1/2" X 2 1/2" X 3/16"
L-124B7	36	UBOLT, 1/2"ø FOR A 5 9/16" O.D. PIPE
L-159B7	36	UBOLT, 1/2"ø FOR A 2" S.R.
XX5816	72	BOLT, 5/8" X 1 3/4"
–	6	2H NUT, 2"ø
–	3	COUPLING NUT, 2"ø

NOTES:

1. 48– 11/16"ø FIELD DRILLED HOLES REQUIRED. FIELD DRILLED HOLES TO BE DRILLED ON EXISTING BOLT HOLE GAUGE LINES.

ALTERNATE POSITION OF ATTACHMENT CLIPS AS SHOWN

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1486
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8389
Email: engineering@verticalstructures.com

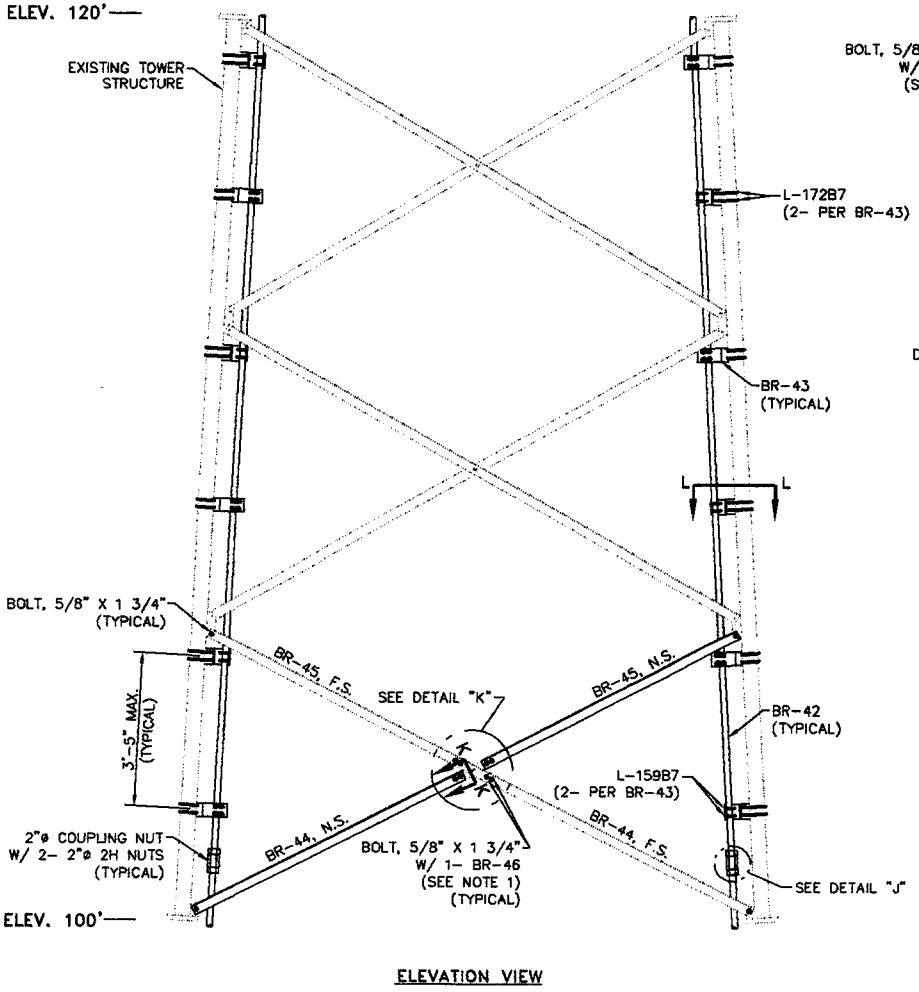
FOR

CROWN CASTLE

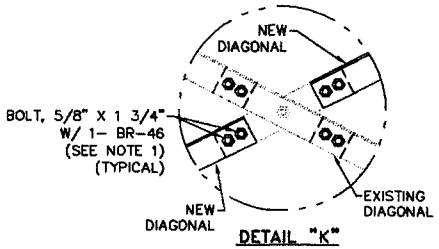
2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

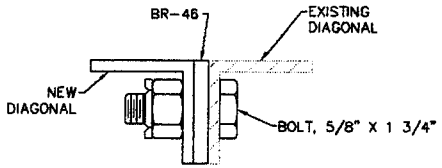
SHEET 6 OF 11 | B TA2005004092-T6 | SCALE: NONE



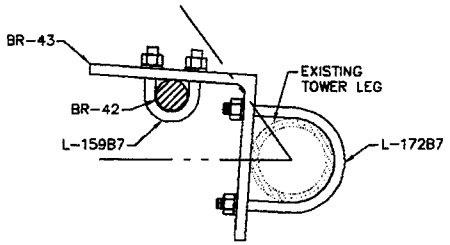
ELEVATION VIEW



DETAIL "K"



SECTION "K-K"



SECTION "L-L"

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-42	3	LEG REINFORCEMENT, 2"ø S.R.
BR-43	18	CLIP ANGLE, L 8" X 8" X 1/2"
BR-44	6	DIAGONAL, L 2 1/2" X 2" X 3/16"
BR-45	6	DIAGONAL, L 2 1/2" X 2" X 3/16"
BR-46	12	SPACER PLATE, 1/4" THICK
L-159B7	36	UBOLT, 1/2"ø FOR A 2" S.R.
L-172B7	36	UBOLT, 1/2"ø FOR A 4 1/2" O.D. PIPE
XX5816	36	BOLT, 5/8" X 1 3/4"
–	6	2H NUT, 2"ø
–	3	COUPLING NUT, 2"ø

NOTES:

1. 24- 11/16"ø FIELD DRILLED HOLES REQUIRED. FIELD DRILLED HOLES TO BE DRILLED ON EXISTING BOLT HOLE GAUGE LINES.

ALTERNATE POSITION OF ATTACHMENT CLIPS AS SHOWN

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8389
Email: engineering@verticalstructures.com

FOR

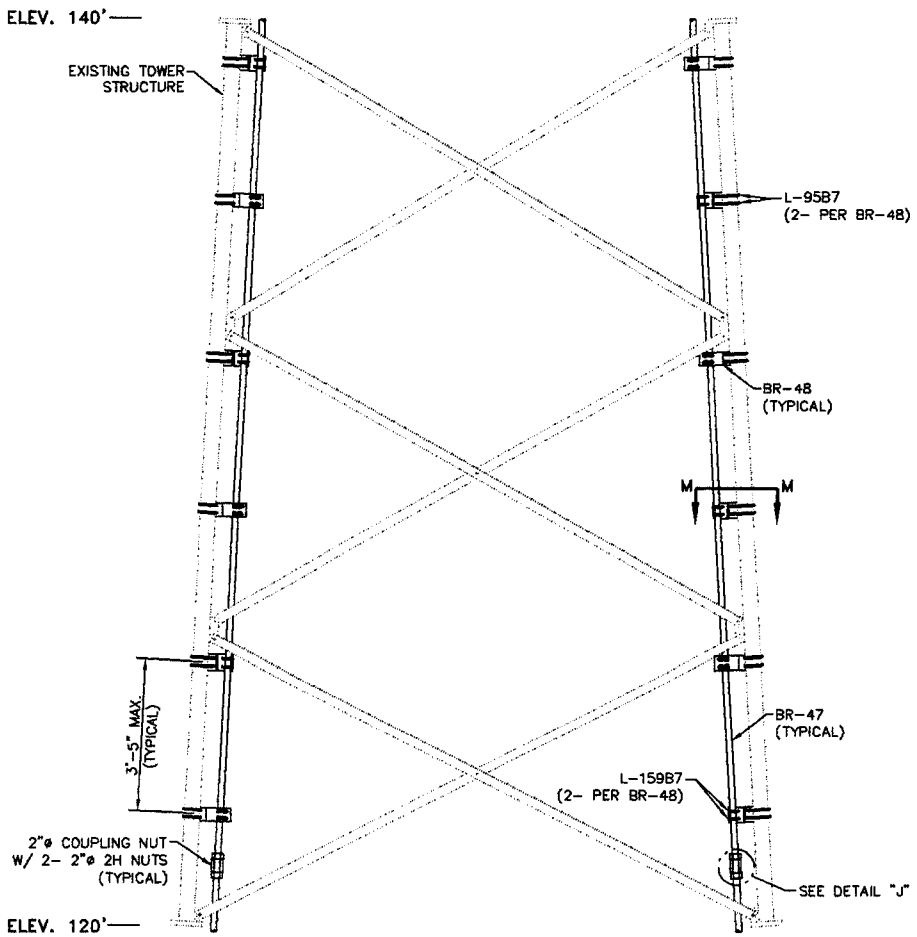
CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

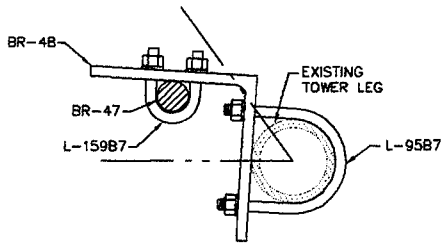
CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

SHEET 7 OF 11 | B TA2005004092-T7 | SCALE: NONE

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-47	3	LEG REINFORCEMENT, 2"ø S.R.
BR-48	18	CLIP ANGLE, L 8" X 8" X 1/2"
L-95B7	36	UBOLT, 1/2"ø FOR A 4" O.D. PIPE
L-159B7	36	UBOLT, 1/2"ø FOR A 2" S.R.
–	6	2H NUT, 2"ø
–	3	COUPLING NUT, 2"ø



ELEVATION VIEW



SECTION "M-M"

ALTERNATE POSITION OF ATTACHMENT CLIPS AS SHOWN

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1498
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

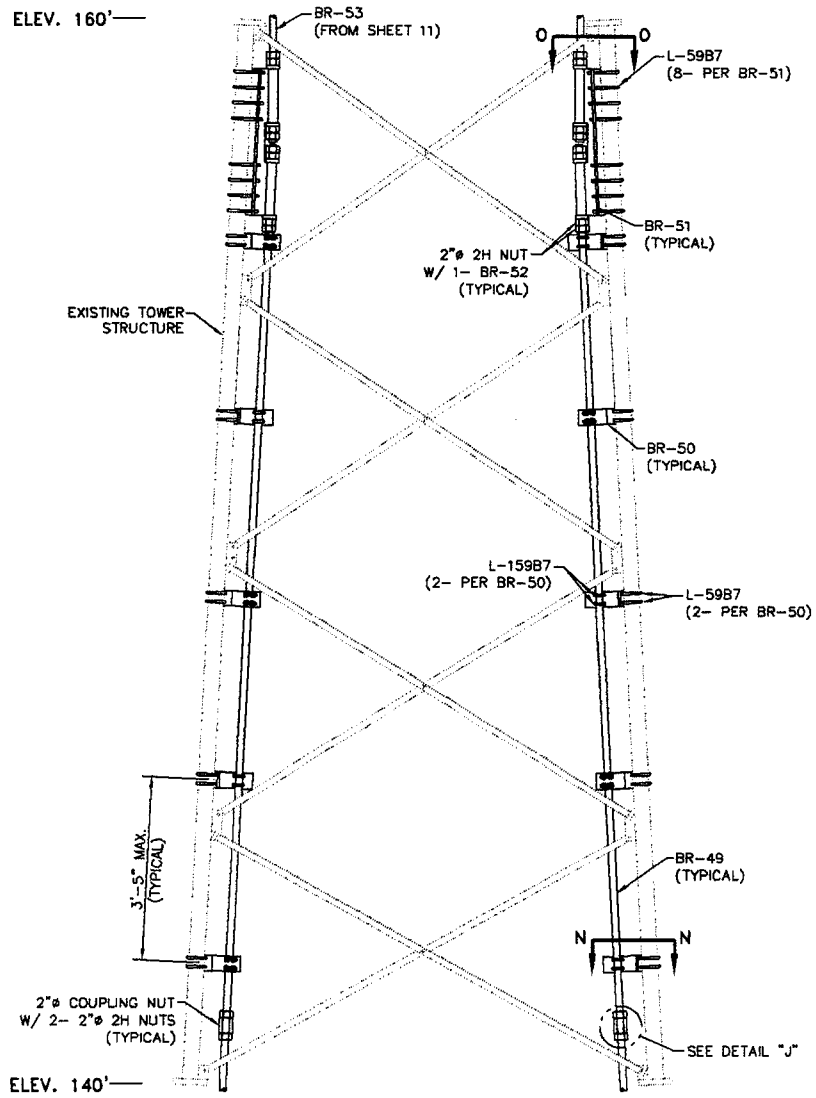
FDR

CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

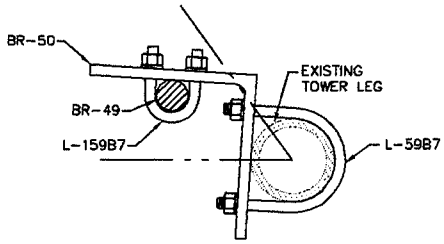
SHEET 8 OF 11 | B TA2005004092-T8 | SCALE: NONE



ELEVATION VIEW

ALTERNATE POSITION OF ATTACHMENT CLIPS AS SHOWN

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-49	3	LEG REINFORCEMENT, 2"ø S.R.
BR-50	15	CLIP ANGLE, L 8" X 8" X 1/2"
BR-51	3	BULKHEAD, FOR A 2"ø S.R.
BR-52	12	PLATE WASHER, 3/4" THICK
L-59B7	54	UBOLT, 1/2"ø FOR A 3 1/2" O.D. PIPE
L-159B7	30	UBOLT, 1/2"ø FOR A 2" S.R.
-	30	2H NUT, 2"ø
-	3	COUPLING NUT, 2"ø



SECTION "N-N"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

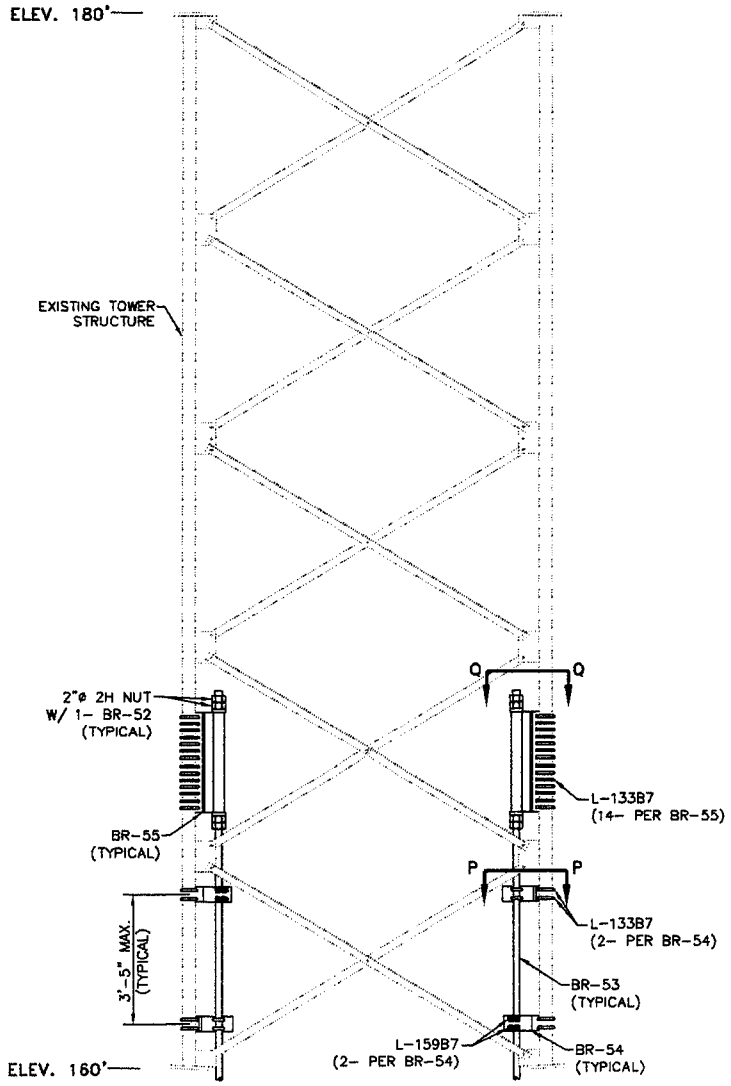
FOR

CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

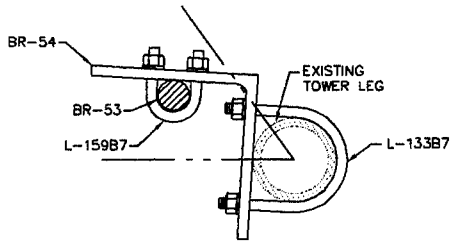
SHEET 9 OF 11 | B TA2005004092-T9 | SCALE: NONE



ELEVATION VIEW

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-52	6	PLATE WASHER, 3/4" THICK
BR-53	3	LEG REINFORCEMENT, 2"ø S.R.
BR-54	6	CLIP ANGLE, L 8" X 8" X 1/2"
BR-55	3	BULKHEAD, FOR A 2"ø S.R.
L-133B7	54	UBOLT, 1/2"ø FOR A 2 3/8" O.D. PIPE
L-159B7	6	UBOLT, 1/2"ø FOR A 2" S.R.
-	12	2H NUT, 2"ø

ALTERNATE POSITION OF ATTACHMENT CLIPS AS SHOWN



SECTION "P-P"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40478
Phone: (859) 624-9360
Fax: (859) 624-9369
Email: engineering@verticalstructures.com

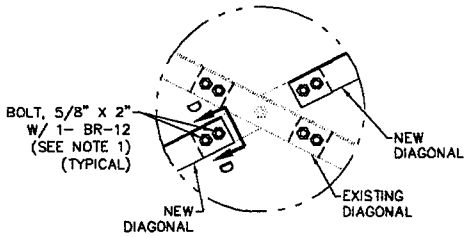
FOR

CROWN CASTLE

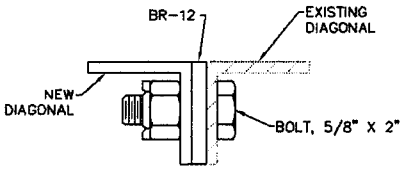
2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

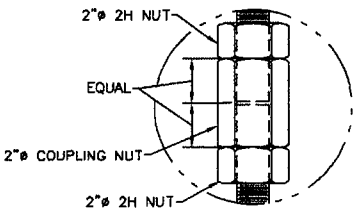
SHEET 10 OF 11 | B TA2005004092-T10 | SCALE: NONE



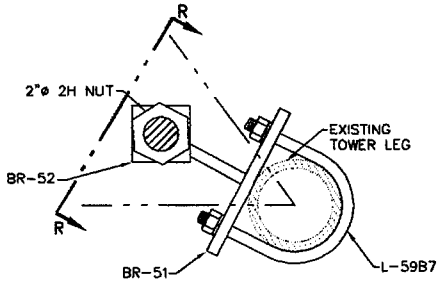
DETAIL "C"
(ELEV. 60' - 0')



SECTION "D-D"
(ELEV. 60' - 0')



DETAIL "J"



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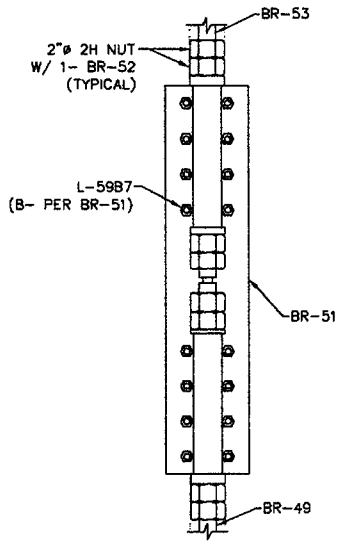
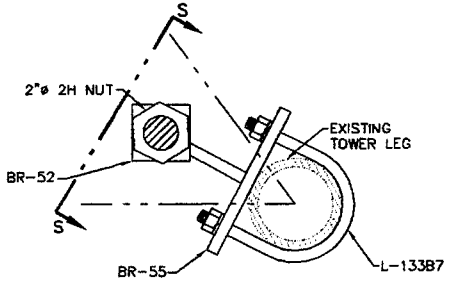
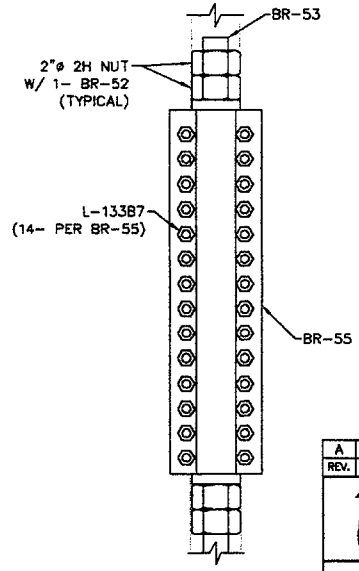


SECTION "R-R"



SECTION "Q-Q"



SECTION "S-S"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1486
Richmond, KY 40476
Phone: (859) 624-8380
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

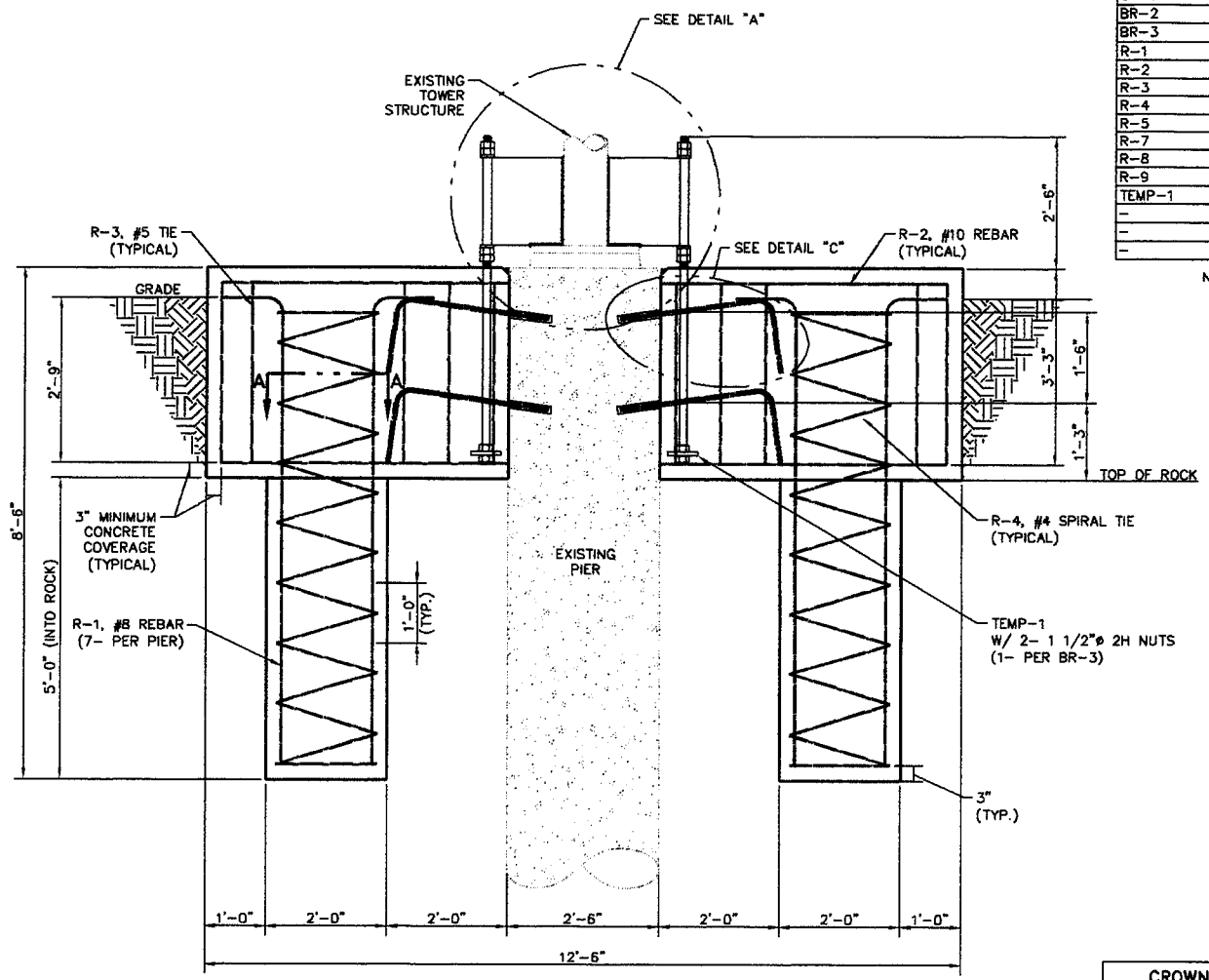
FOR

CROWN CASTLE

2005 MODIFICATIONS
TOWER REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

SHEET 11 OF 11 | B TA2005004092-T11 | SCALE: NONE



ELEVATION VIEW

BILL OF MATERIALS		
MARK NO.	QTY.	DESCRIPTION
BR-1	6	ANCHOR BOLT LUG, WELDMENT
BR-2	12	PLATE WASHER, 3/4" THICK
BR-3	6	ANCHOR BOLT, 1 1/2"ø X 5'-9" 50 KSI W/ HARDWARE
R-1	36	#8 REBAR X 8'-8"
R-2	24	#10 REBAR X 12'-0"
R-3	30	#5 TIE X 14'-3"
R-4	6	#4 SPIRAL TIE, 1'-6" O.D. X 7'-6" W/ 6" PITCH
R-5	36	#8 REBAR X 3'-7"
R-7	24	#5 REBAR X 7'-9"
R-8	12	#5 REBAR X 7'-3"
R-9	24	#10 REBAR X 4'-6"
TEMP-1	6	ANCHOR PLATE, 3/4" THICK
-	23.4	CONCRETE (CU. YARDS)
-	-	ULTRABOND 1 STRUCTURAL EPOXY GEL (AS NEEDED)
-	-	SIKAFLEX-1A ELASTIC SEALANT OR EQUIVALENT (AS NEEDED)

NOTES:

1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE.
2. REBAR: REINFORCING BARS SHALL CONFORM TO ASTM A615 SPECIFICATIONS, GRADE 60.
3. CONCRETE TO HAVE A MINIMUM OF 6 SACKS OF CEMENT PER CUBIC YARD AND HAVE 3000 P.S.I. MINIMUM COMPRESSION AT 28 DAYS.
4. BACKFILL IS TO BE MADE IN LIFTS NOT TO EXCEED 18 INCHES. EACH LIFT IS TO BE TAMPED BY HAND OR WITH HAND HELD VIBRATORY COMPACTOR SUFFICIENTLY TO REMOVE LARGE VOIDS AND REDUCE SETTLEMENT. EXCAVATED AREA TO HAVE MINIMUM OF 6 INCH MOUND ABOVE NATURAL GROUND SURFACE WHEN COMPLETED. NO FROZEN MATERIALS, LARGE ROCKS OR ORGANIC MATERIAL IS TO BE USED FOR BACKFILL.
5. EXISTING FOUNDATION SHOULD BE CLEANED OF GREASE, DIRT, & LOOSE DEBRIS PRIOR TO PLACING THE NEW CONCRETE.
6. ALL QUANTITIES IN BILL OF MATERIALS ARE FOR ALL THREE PEDESTAL FOUNDATIONS.
7. EMBED R-5 BARS, SLIGHTLY DOWNWARD, INTO 1 3/8" X 10" DEEP DRILLED HOLES IN THE EXISTING FOUNDATION USING ULTRABOND 1 STRUCTURAL EPOXY GEL. SLOPE AS NEEDED FOR PLACEMENT OF EPOXY.
8. CARE SHOULD BE TAKEN NOT TO DRILL THROUGH ANY STEEL IN THE EXISITNG CONCRETE. IF THE DRILL HITS EXISTING STEEL, BACK OUT AND PLACE NEARBY.

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

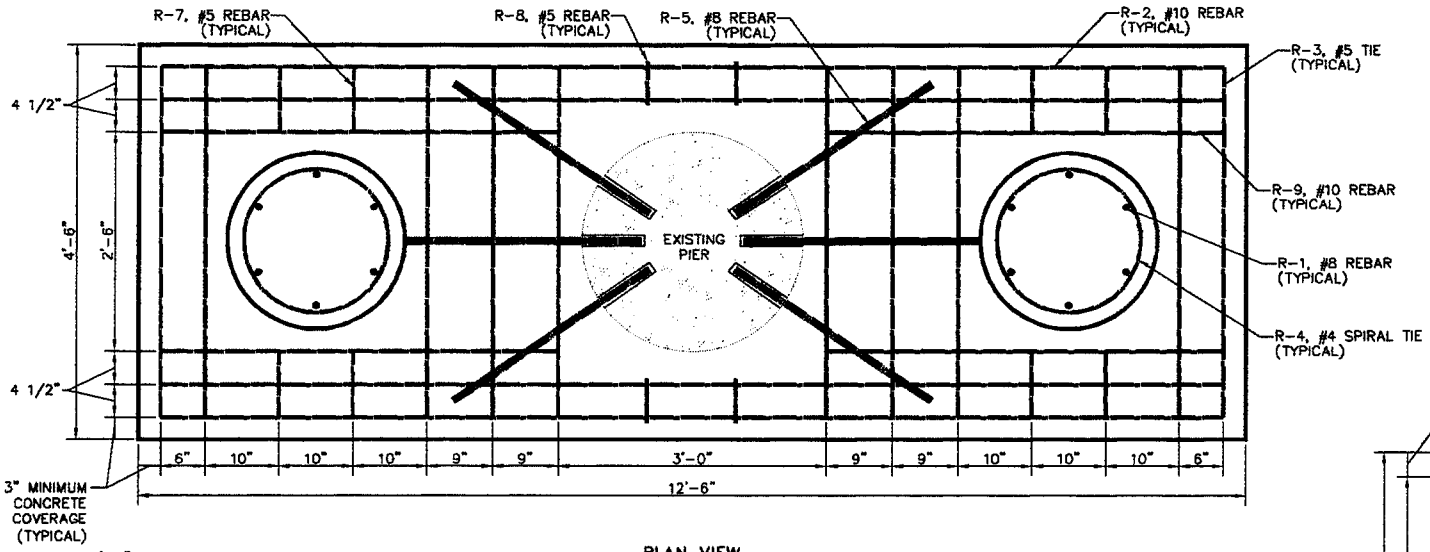
VERTICAL STRUCTURES INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8360
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

FOR

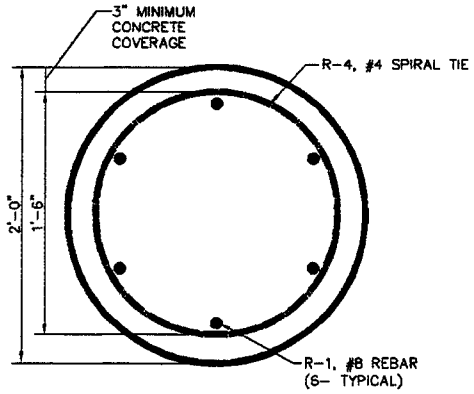
CROWN CASTLE

2005 MODIFICATIONS
FOUNDATION REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

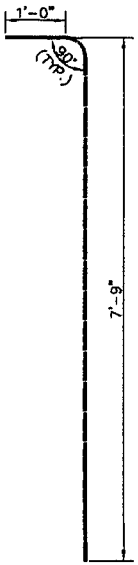
CROWN CASTLE BU# 806353			
DRAFTSPERSON: S. BURNETT	DATE 12-7-05	SHEET 1 OF 3	B TF2005004092-T1
CHK'D BY:	DATE		SCALE: NONE
ENGR:	DATE		



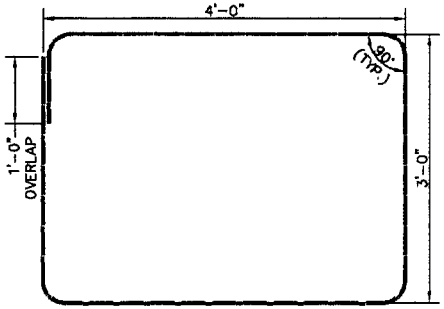
PLAN VIEW



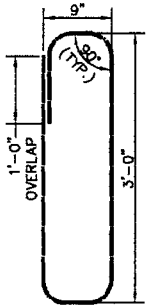
SECTION "A-A"



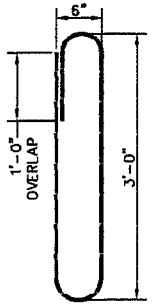
R-1 BAR DETAIL



R-3 TIE DETAIL



R-7 TIE DETAIL



R-8 TIE DETAIL

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8350
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

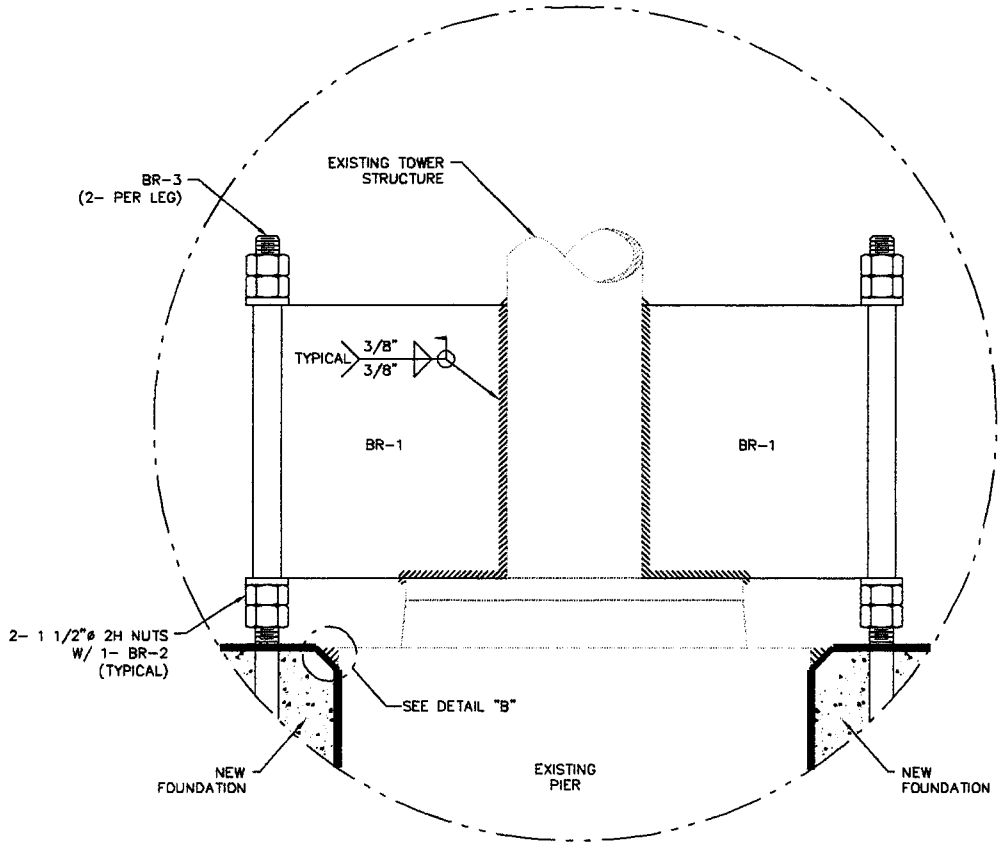
FOR

CROWN CASTLE

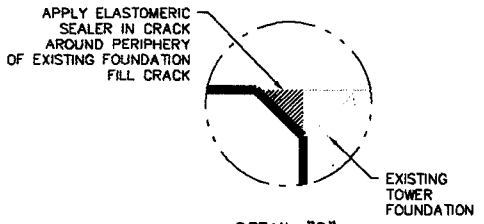
2005 MODIFICATIONS
FOUNDATION REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

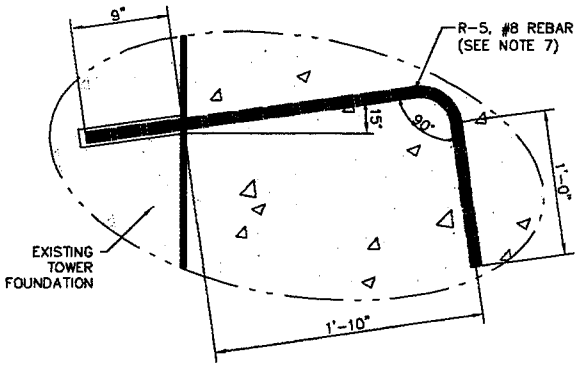
SHEET 2 OF 3	B TF2005004092-T2	SCALE: NONE



DETAIL "A"



DETAIL "B"



DETAIL "C"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	12-7-05	SWB

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-6360
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

FOR

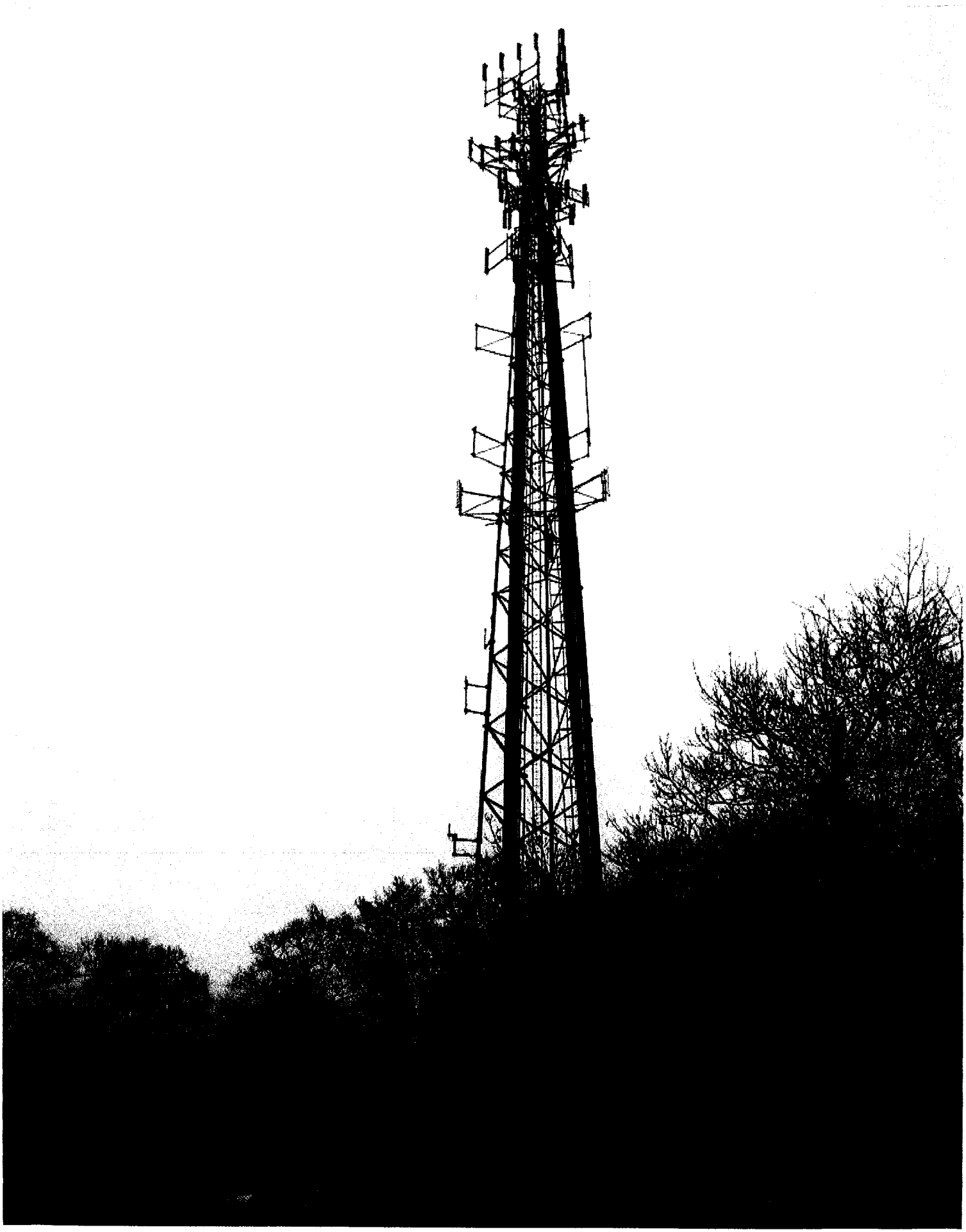
CROWN CASTLE

2005 MODIFICATIONS
FOUNDATION REWORK FOR A
180' FWT SELF-SUPORTING TOWER
SITE: BRG 124, CT

CROWN CASTLE BU# 806353	
DRAFTSPERSON: S. BURNETT	DATE 12-7-05
CHK'D BY:	DATE
ENGR:	DATE

SHEET 3 OF 3	B TF2005004092-T3	SCALE: NONE

Site 2



Site 2

Site Specific Attachments

Site 3

1. Site Plans
2. Tower Structural Analysis
3. Site Photographs

APPROVALS

NAME (PRINT)	SIGNATURE	DATE
CINGULAR		
NAME (PRINT)	SIGNATURE	DATE
SAI		
NAME (PRINT)	SIGNATURE	DATE
SITING COUNCIL COMMITTEE		
NAME (PRINT)	SIGNATURE	DATE
OTHER		

cingular WIRELESS

SITE NUMBER: 2147
SITE NAME: WESTPORT - SP TWR

DRAWING INDEX

		REV
2147 - T1	TITLE SHEET	0
2147 - C1	SITE PLAN	0
2147 - C2	SITE ELEVATION & ANTENNA PLAN	0
2147 - C3	ANTENNA PLUMBING DIAGRAM-ALPHA	0
2147 - C4	RF DATA INFORMATION	0

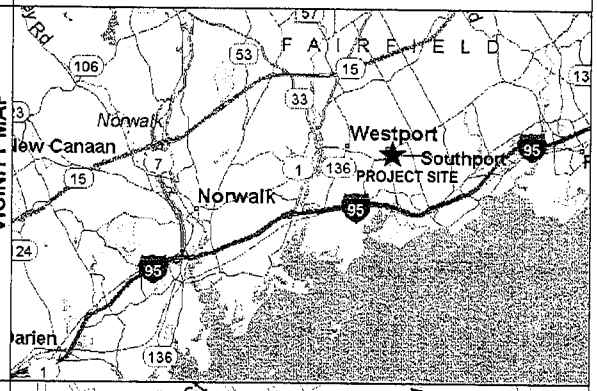
PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE NUMBER:	2147
SITE NAME:	WESTPORT – SP TWR
ADDRESS:	RTE 1 SHERWOOD ISLAND/BSTN PST RD
CITY, STATE ZIP	WESTPORT, CT
LATITUDE:	41.137378°
LONGITUDE:	-73.334803°
JURISDICTION:	FAIRFIELD COUNTY
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
SITE TYPE:	LATTICE
RAD CENTER:	133'-0"
OWNER:	CT STATE POLICE

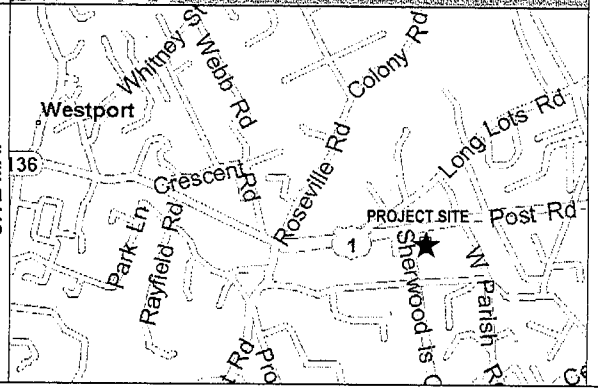
MAPS & DIRECTIONS

FROM I-95 EAST TAKE EXIT 18 AND TURN ONTO SR-476 [SHERWOOD IS CONNECTOR] NORTH. THE TOWER SITE IS ON THE RIGHT.

VICINITY MAP



SITE MAP



BLDG. CODES AND STANDARDS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
INTERNATIONAL BUILDING CODE (IBC), 2003

ELECTRICAL CODE:
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70 – 2002 NATIONAL ELECTRICAL CODE

LIGHTNING PROTECTION CODE:
NFPA 780 – 2000, LIGHTNING PROTECTION CODE

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS.
AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES;
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1275, GENERAL INSTALLATION REQUIREMENTS

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM – DC POWER SYSTEMS – TELECOM, ENVIRONMENTAL PROTECTION

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.
340 COMMERCE GREEN BLVD, SUITE 340
SUGAR LAND, TX 77478
PHONE: 281-343-7099
FAX: 281-343-7127

SITE NUMBER:
2147
SITE NAME:
WESTPORT - SP TWR
SITE ADDRESS:
RTE 1 SHERWOOD ISLAND/BSTN PST RD
WESTPORT, CT

DRAWN BY:	JR
CHECKED BY:	DP
PROJECT NO:	0504A167-8995133

SUBMITTALS

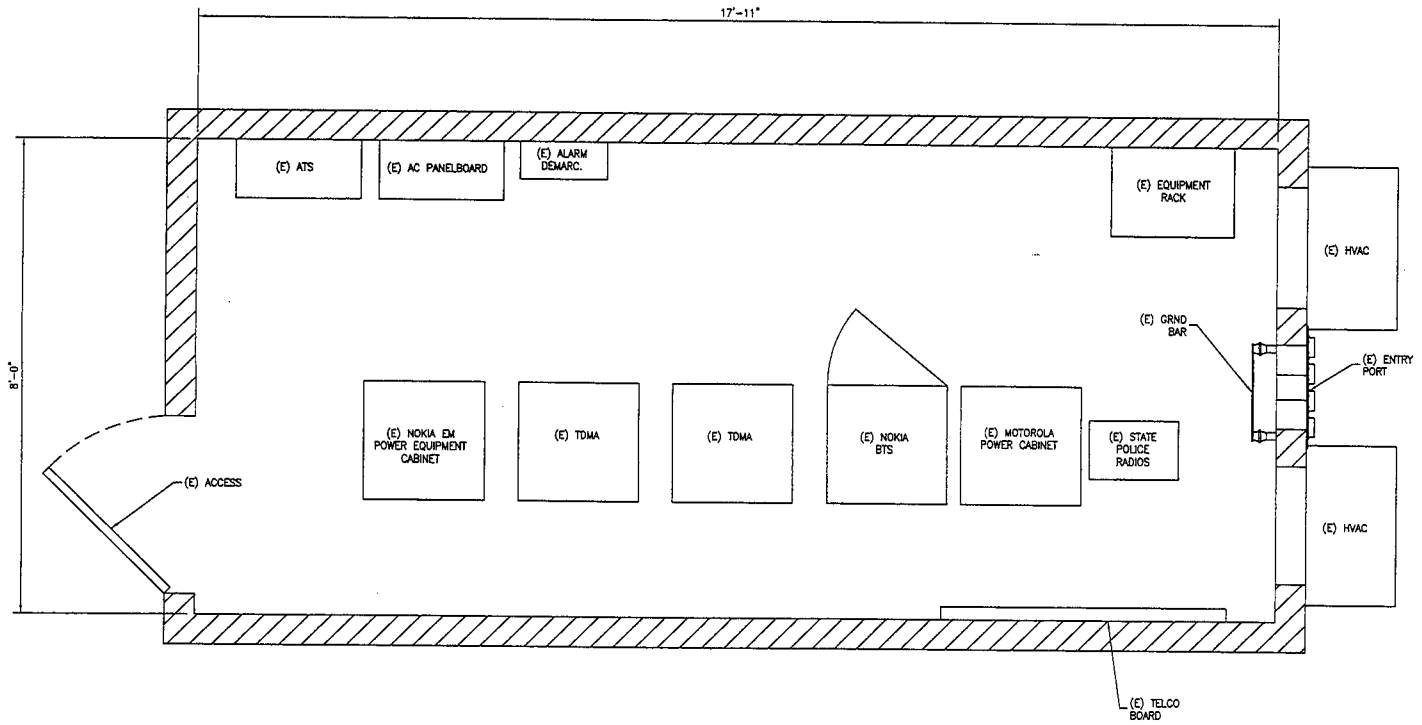
NO	DESCRIPTION	BY	DATE
0	SITING COMMITTEE CDS	JR	08/26/05

STATE OF CONNECTICUT
OSCAR PERALTA
No. 21292
LICENSED PROFESSIONAL ENGINEER
9/14/05

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T1

PURPOSE OF THESE DESIGN DOCUMENTS ARE FOR 2 ANTENNA REPLACEMENTS, 1 ANTENNA REMOVAL, AND 1 PROPOSED 1 1/4" COAXIAL CABLE FOR CINGULAR WIRELESS



SITE PLAN (1 / C1)
SCALE: 11x17 - 1/2"=1'-0"
SCALE: 22x34 - 1"=1'-0"

N

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.
340 CONCORD PARK BLVD, SUITE 340
SUGARLAND, TX 77478
PHONE: 281-343-7126
FAX: 281-343-7127

SITE NUMBER:
2147
SITE NAME:
WESTPORT - SP TWR
SITE ADDRESS:
RTE 1 SHERWOOD ISLAND/BSTN
PST RD
WESTPORT, CT

DRAWN BY:	JR
CHECKED BY:	OP
PROJECT NO:	0504A187-B995133

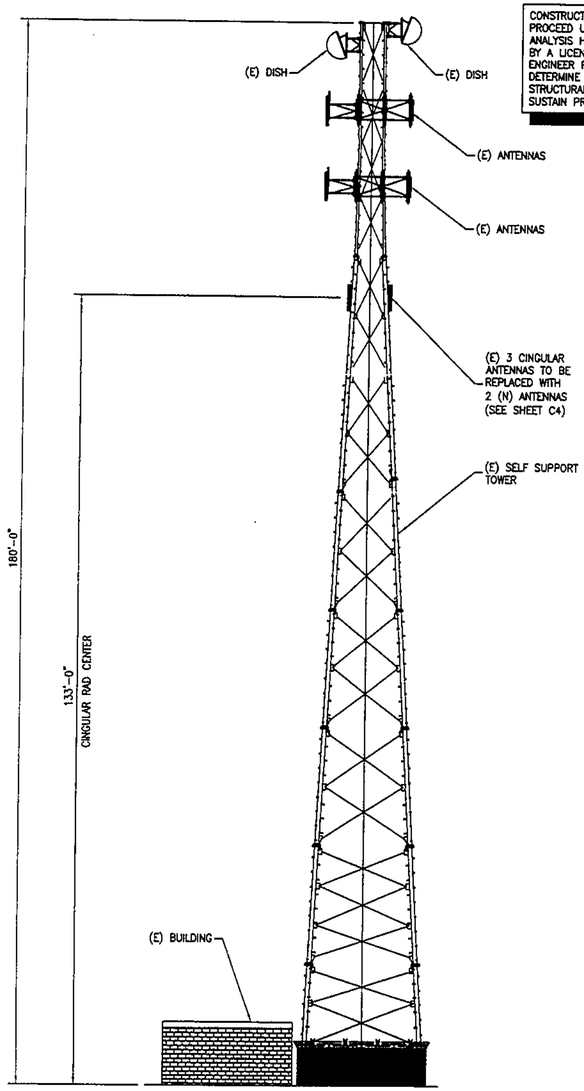
SUBMITTALS

NO	DESCRIPTION	BY	DATE
0	SITING COMMITTEE CDS	JR	08/26/05

STATE OF CONNECTICUT
OSCAR PEREZ PLAZA
No. 21292
LICENSED PROFESSIONAL ENGINEER
9/19/05

SHEET TITLE
SITE PLAN

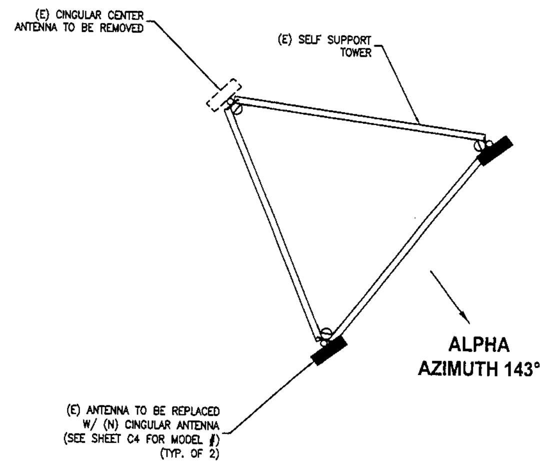
SHEET NUMBER
C1



CONSTRUCTION SHALL NOT PROCEED UNTIL A STRUCTURAL ANALYSIS HAS BEEN PERFORMED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN CT TO DETERMINE IF THE TOWER IS STRUCTURALLY ADEQUATE TO SUSTAIN PROPOSAL.

SITE ELEVATION (1 / C2)
SCALE: 11x17 – NTS
SCALE: 22x34 – NTS

PURPOSE OF THESE DESIGN DOCUMENTS ARE FOR 2 ANTENNA REPLACEMENTS, 1 ANTENNA REMOVAL, AND 1 PROPOSED 1 1/4" COAXIAL CABLE FOR CINGULAR WIRELESS



ANTENNA PLAN VIEW (2 / C2)
SCALE: 11x17 – NTS
SCALE: 22x34 – NTS

cingular WIRELESS

SAI communications

PSG ENGINEERING, LTD.

SITE NUMBER:
2147
SITE NAME:
WESTPORT - SP TWR
SITE ADDRESS:
RTE 1 SHERWOOD ISLAND/BSTN PST RD
WESTPORT, CT

IT IS A VIOLATION OF THE PROPRIETARY RIGHTS OF THE WIRELESS CARRIER TO ALTER THIS DOCUMENT UNLESS THEY ARE INSTRUCTED ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER.

DRAWN BY: JR
CHECKED BY: OP
PROJECT NO: 0504A167-B995133

SUBMITTALS

NO	DESCRIPTION	BY	DATE
0	SITING COMMITTEE CDS	JR	08/26/05

STATE OF CONNECTICUT * OSCAR PEDRAZA * No. 21292 * LICENSED PROFESSIONAL ENGINEER
9/14/05

SHEET TITLE
SITE ELEVATION & ANT PLAN

SHEET NUMBER
C2

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF 180' EXISTING SELF-SUPPORTING LATTICE TOWER FOR NEW ANTENNA ARRANGEMENT

Cingular Site #2147
Connecticut State Police Tower
880 Boston Post Road
Westport, Connecticut

prepared for

Site Acquisitions, Inc.
184 Rockingam Road, Unit A
Londonderry, NH 03053

cingular WIRELESS

Cingular Wireless
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

prepared by

URS

URS CORPORATION
500 ENTERPRISE DR, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36915467.00008
SAI-007

January 4, 2006

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1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 180' self-supporting lattice tower located at 880 Post Road East in Westport, Connecticut. The analysis was conducted in accordance with the TIA/EIA-222-F standard for wind velocity of 90 mph concurrent with ½" ice design wind load. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in section 2 and 6 of this report. The proposed Cingular Wireless modifications are as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove existing APL868013 antennas **Install (6) Powerwave 7770.00 antennas, (6) LGP13519 diplexers, and (6) LGP21401 TMA's on the existing (3) T-Arms with (3) new 1 1/4" coax cables**	**Cingular Wireless (Proposed)**	**@ 133'**

The results of the analysis indicate that the existing tower structure is in compliance with the proposed loading conditions. **The tower is considered structurally adequate under the TIA/EIA-222-F wind load specified above and the existing and proposed antenna loadings.** Also the tower's twist and sway are within the Connecticut State Police specification of 0.75 degrees.

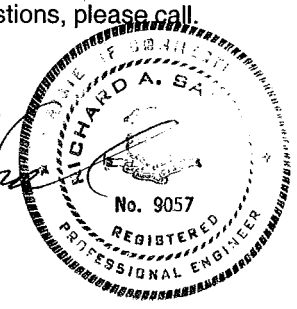
This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
2) Original tower report prepared by Rohn Industries, Inc., engineering file 26263DL and drawing C910693 dated February 1, 1991.
3) Reinforcements from URS Structural Reports dated from 1999 to 2002.
4) Antenna and mount configuration as specified in section 2 and 6 of this report.
5) All coaxial cable is installed as specified in section 6 of this report.
6) Soil investigation and foundation capacity report prepared by Dr. Clarence Welti, P.E., P.C., dated October 10, 2002.
7) Connecticut State Police wind loading requirements for 90 mph wind concurrent with ½" ice plus the dead load of the structure and any ancillary items without reduction factors.
8) Sprint proposed installation and tower reinforcement per URS Structural Report (job number 36916580) dated July 15, 2005 is not considered in this analysis.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,
URS Corporation AES



Richard A. Sambor, P.E.
Manager Facilities Design

RAS/jek

cc: IA, DR, AA – URS
CF/Book

2. INTRODUCTION

A structural analysis of the existing 180' self-supporting lattice tower located at 880 Post Road East in Westport, Connecticut was performed by URS Corporation, AES (URS) for Cingular Wireless. The purpose of this analysis was to analyze the existing tower for its existing and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection) and stress on the tower, and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

The structure is a 180' self-supporting lattice tower manufactured by Rohn Industries, Inc. The tower is constructed of pipe legs, diagonal braces, horizontal braces, and inner horizontal braces. The tower sections are bolted together. The width of the face is 8'-6 ½" at the top and 27'-8 1/8" at the bottom. The tower geometry and structure member sizes were taken from Rohn Industries, Inc., engineering file 26263DL and drawing C910693 dated February 1, 1991.

The existing structure supports several communication antennas. The antenna and mount configuration is as follows:

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(2) PD1142 antennas	CSP (existing)	Pipe Mount	180'	(2) 7/8" coax cables
(1) PA6-85 dish	CSP (existing)	Dish Mount	177'	(1) EW63 coax cable
(1) PAR6-85 dish	Verizon (existing)	Dish Mount	170'	(1) 7/8" coax cable
(1) P6-F9 dish	CSP (existing)	Dish Mount	169'	(1) 7/8" coax cable
(6) DB844 antennas and (6) LPA-185063/8CFx2 antennas	Verizon (existing)	(3) T-Frame Mounts	162'	(12) 1 5/8" coax cables
(2) OGT9-806 antennas	CSP (existing)	Side Arm Mount	160'	(2) 1 5/8" coax cables
(2) AP11-850 antennas	CSP (existing)	Side Arm Mount	160'	(2) 1 5/8" coax cables
(1) DB222 antenna	CSP (existing)	Side Arm Mount	160'	(1) 7/8" coax cable
(1) DB536 antenna	CSP (existing)	Side Arm Mount (listed above)	160'	(1) 7/8" coax cable
(9) 58010 antennas and (4) TMA's	Cingular BLUE (existing)	(3) T-Frame Mounts	140'	(9) 1 5/8" coax cables
(6) Powerwave 7770.00 antennas, (6) LGP13519 diplexers, and (6) LGP21401 TMA's	**Cingular (proposed)**	(3) T-Frame Mounts	133'	(9) existing 1 1/4" coax cables and **(3) new 1 1/4" coax cables**
(3) DR65-18-XXDPL2Q antennas	T-Mobile (existing)	(3) Flush Mounts	126'	(12) 1 5/8" coax cables
(1) GPS antenna	Verizon (existing)	Side Arm Mount	60'	(1) 1/2" coax cable

Note: Omni/Whip antenna heights are to their base. Any existing antenna that is not on the tower is an approved/future antenna.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

Methodology:

The structural analysis was done in accordance with the TIA/EIA-222-F, Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The analysis was conducted using ERI Tower 3.0. One load condition was evaluated as shown below which was compared to allowable stresses according to AISC and TIA/EIA. The load combination was investigated in ERI Tower 3.0 to determine the stress, sway and rotation.

Load Condition 1 = 90 mph Wind Load (with ½" radial ice) + Tower Dead Load

The TIA/EIA standard permits one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For purposes of this analysis, in computing the load capacity allowable stresses of tower members were increased by one-third. In addition, the appropriate "k" factors were assigned to each member.

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. **The analysis indicates that the tower has sufficient capacity to carry the loads applied.** The foundation reactions were below the allowable values in the foundation capacity report. The tower top twist and sway values were compared with the allowable values per the Connecticut State Police and found to be acceptable. Detailed analysis and calculations for the proposed antenna arrangement and load condition are provided in section 6 of this report.

Tower Twist & Sway at Top:

Description	Current	Allowable
Tower Twist (degrees)	0.268	0.750
Tower Sway (degrees)	0.517	0.750

5. CONCLUSIONS

The results of the analysis indicate that the existing tower structure is in compliance with the proposed loading conditions. **The tower is considered structurally adequate under the TIA/EIA-222-F wind load specified above and the existing and proposed antenna loadings.** Also the tower's twist and sway are within the Connecticut State Police specification of 0.75 degrees.

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cables are installed as specified in this report.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

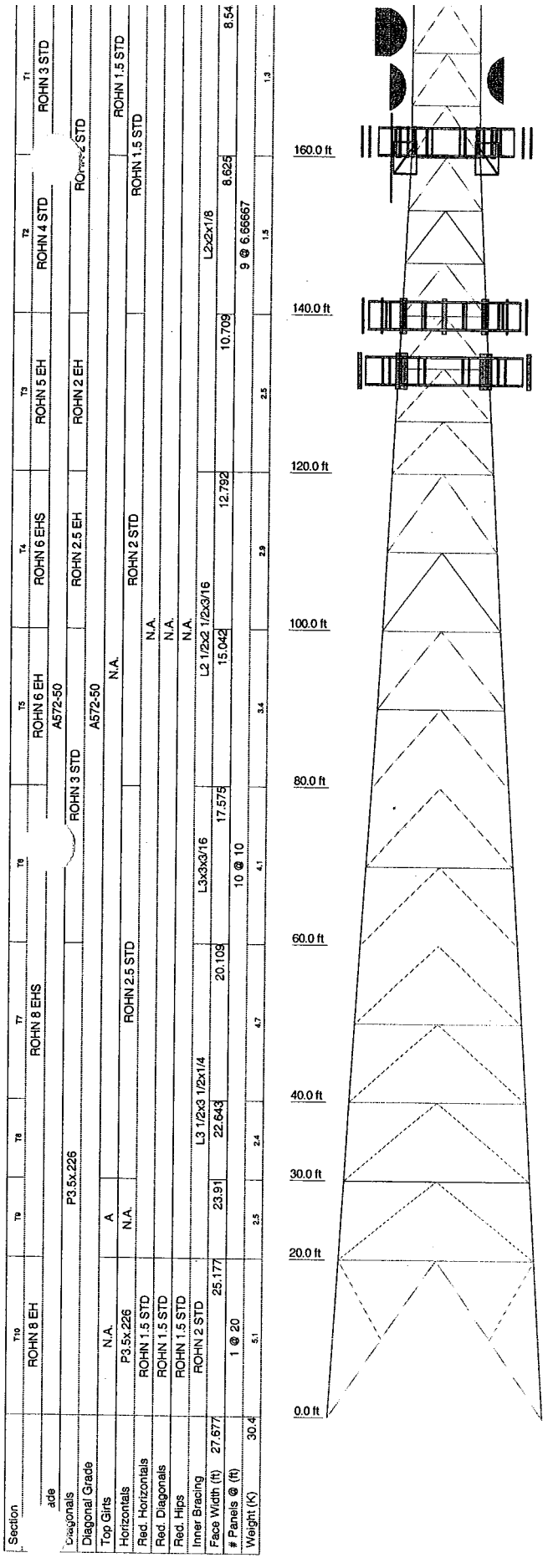
Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

ERI TOWER INPUT/OUTPUT SUMMARY



APPURTENANCES

TYPE	ELEVATION	TYPE	ELEVATION
PD1142 (State Police)	180	6' Side Mount Standoff (State Police)	160
PD1142 (State Police)	180	(3) 58010 (Cingular BLUE)	140
PA6-85 (State Police)	176	TMA (Cingular BLUE)	140
PAR6-105 (Verizon Wireless)	170	TMA (Cingular BLUE)	140
P6-F9 (State Police)	169	(2) TMA (Cingular BLUE)	140
LPA-185063/8CFx2 (Verizon)	162	Valmont 12' T-Frame Sector Mount (Cingular BLUE)	140
LPA-185063/8CFx2 (Verizon)	162		
DB844H105ESX (Verizon)	162	Valmont 12' T-Frame Sector Mount (Cingular BLUE)	140
DB844H105ESX (Verizon)	162		
LPA-185063/8CFx2 (Verizon)	162	Valmont 12' T-Frame Sector Mount (Cingular BLUE)	140
LPA-185063/8CFx2 (Verizon)	162		
DB844H105ESX (Verizon)	162	(3) 58010 (Cingular BLUE)	140
DB844H105ESX (Verizon)	162	(3) 58010 (Cingular BLUE)	140
LPA-185063/8CFx2 (Verizon)	162	(2) 7770.00 (Cingular)	133
LPA-185063/8CFx2 (Verizon)	162	(2) LPG13519 Diplexer (Cingular)	133
Rohn 12' T-Frame Sector Mount (Verizon)	162	(2) LPG13519 Diplexer (Cingular)	133
		(2) LPG13519 Diplexer (Cingular)	133
Rohn 12' T-Frame Sector Mount (Verizon)	162	15' T-Frame Sector Mount (Cingular)	133
		15' T-Frame Sector Mount (Cingular)	133
Rohn 12' T-Frame Sector Mount (Verizon)	162	(2) LPG21401 TMA (Cingular)	133
		(2) LPG21401 TMA (Cingular)	133
DB844H105ESX (Verizon)	162	15' T-Frame Sector Mount (Cingular)	133
DB844H105ESX (Verizon)	162	(2) 7770.00 (Cingular)	133
OGT9-806 (State Police)	160	(2) 7770.00 (Cingular)	133
OGT9-806 (State Police)	160	(2) LPG21401 TMA (Cingular)	133
AP11-850 (State Police)	160	DR65-18-XXDPL2Q (T-Mobile)	126
AP11-850 (State Police)	160	DR65-18-XXDPL2Q (T-Mobile)	126
DB222 (State Police)	160	DR65-18-XXDPL2Q (T-Mobile)	126
DB536 (State Police)	160	3' Side Mount Standoff (Verizon)	60
6' Side Mount Standoff (State Police)	160	GPS (Verizon)	60
6' Side Mount Standoff (State Police)	160		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	ROHN 2.5 STD		

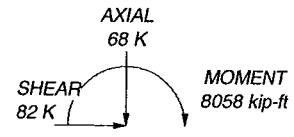
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

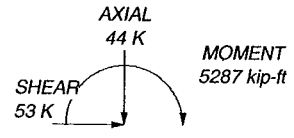
TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.
4. TOWER RATING: 99.1%

MAX PIER FORCES:
DOWN: 359 K
UPLIFT: -297 K
SHEAR: 48 K



TORQUE 64 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 25 kip-ft
REACTIONS - 90 mph WIND

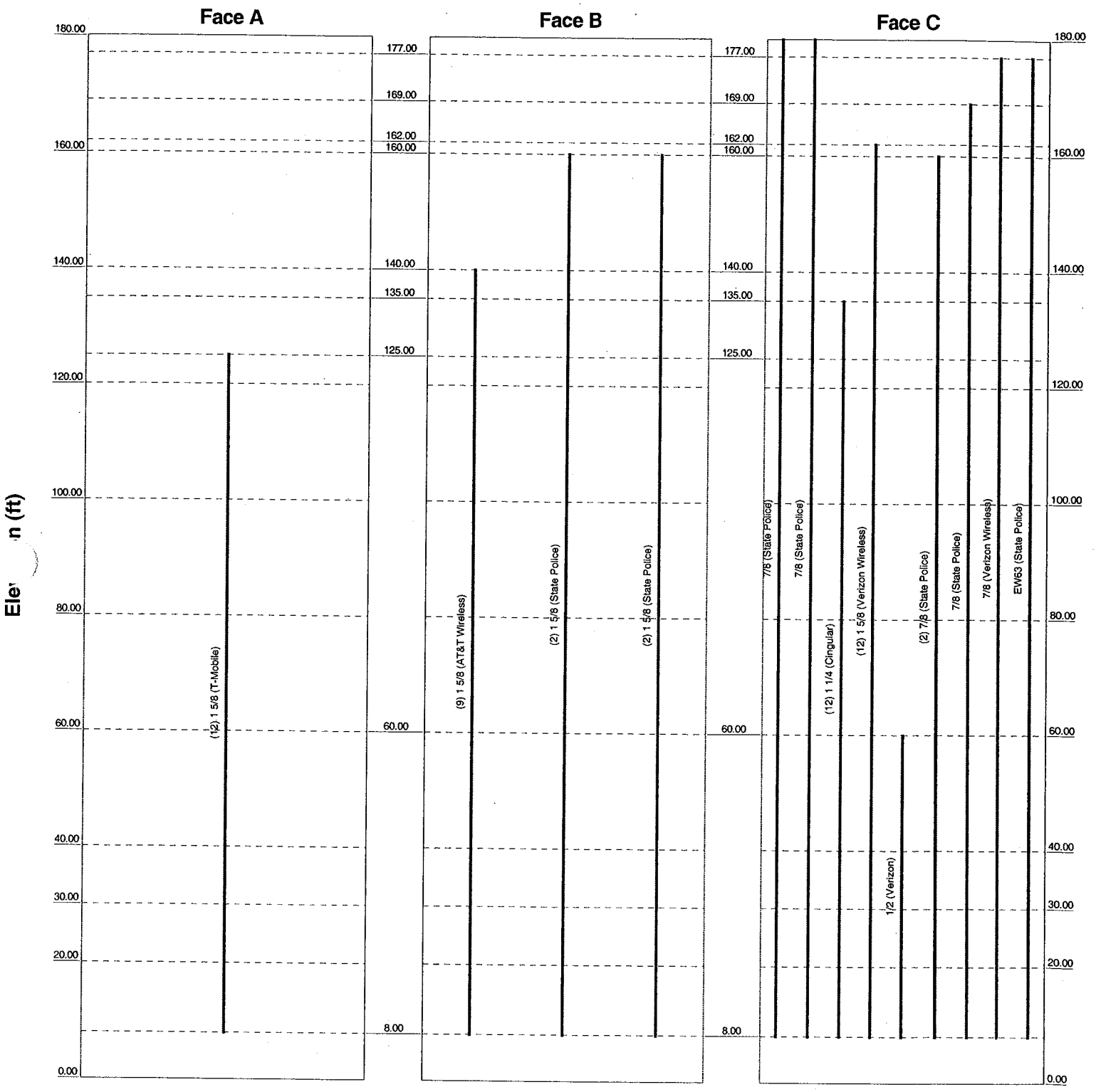
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: **180' Lattice Tower**			
Project: **Westport, Connecticut**			
Client:	Drawn by: Jed Kiernan	App'd:	
Code: TIA/EIA-222-F	Date: 01/04/06	Scale: NT	
Path: N:\jkiernan\SAI-007\ERI Files\180' Self-Supported Lattice Tower.eri		Dwg No. E-	

ERI TOWER FEEDLINE DISTRIBUTION CHART

0' - 180'

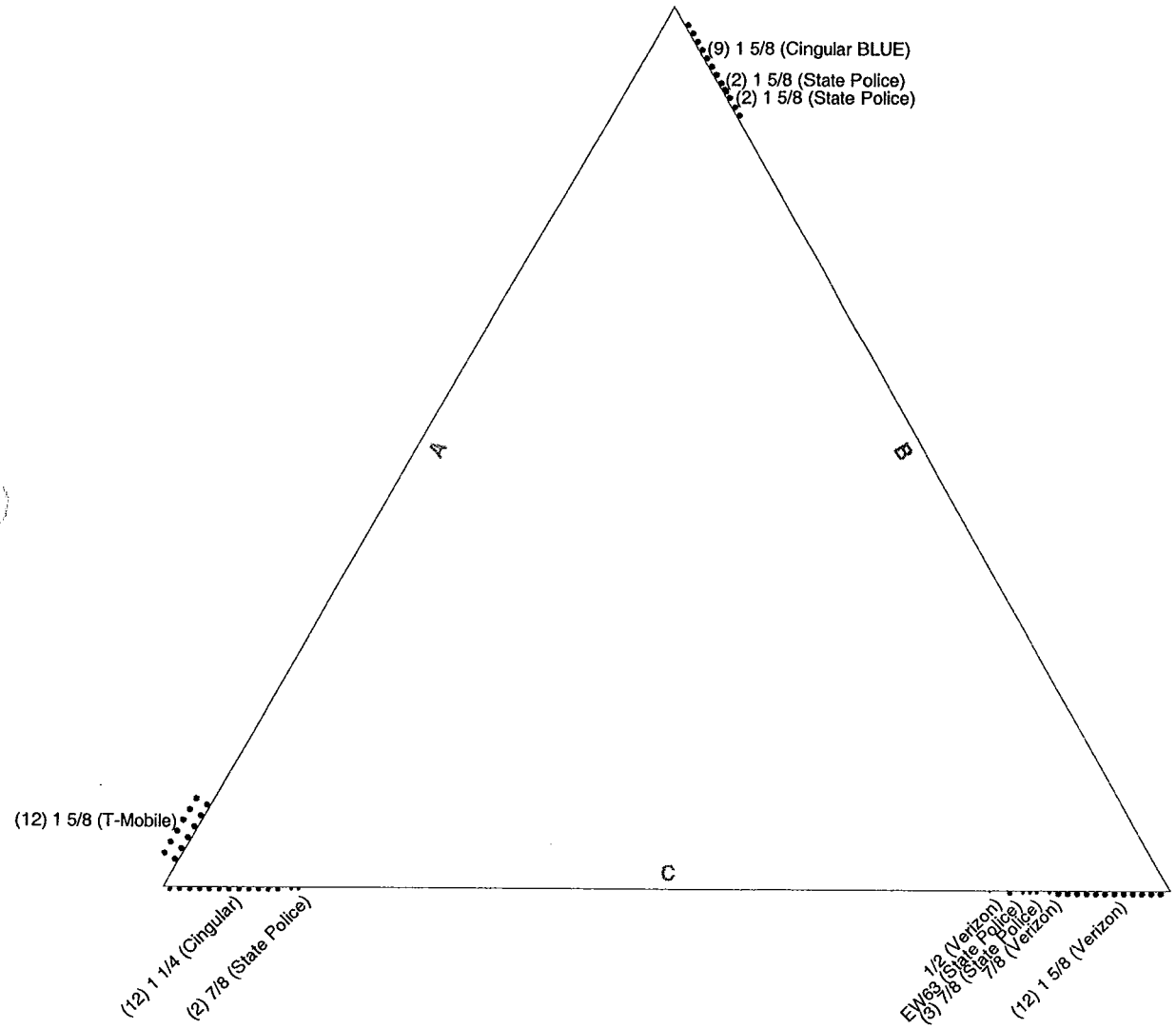
Round | Flat | App In Face | App Out Face | Truss Leg



URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job: ***180' Lattice Tower***		
	Project: ***Westport, Connecticut***		
	Client:	Drawn by: Jed Kiernan	App'd:
	Code: TIA/EIA-222-F	Date: 01/04/06	Scale: NTS
	Path: N:\jkiernan\SAI-007\ERI Files\180' Self-Supported Lattice Tower.eri		Dwg No. E-1

ERI TOWER FEEDLINE PLAN

_____ Round _____ Flat _____ App In Face _____ App Out Face



URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: ***180' Lattice Tower***			
Project: ***Westport, Connecticut***			
Client:	Drawn by: Jed Kiernan	App'd:	
Code: TIA/EIA-222-F	Date: 01/04/06	Scale: NTS	
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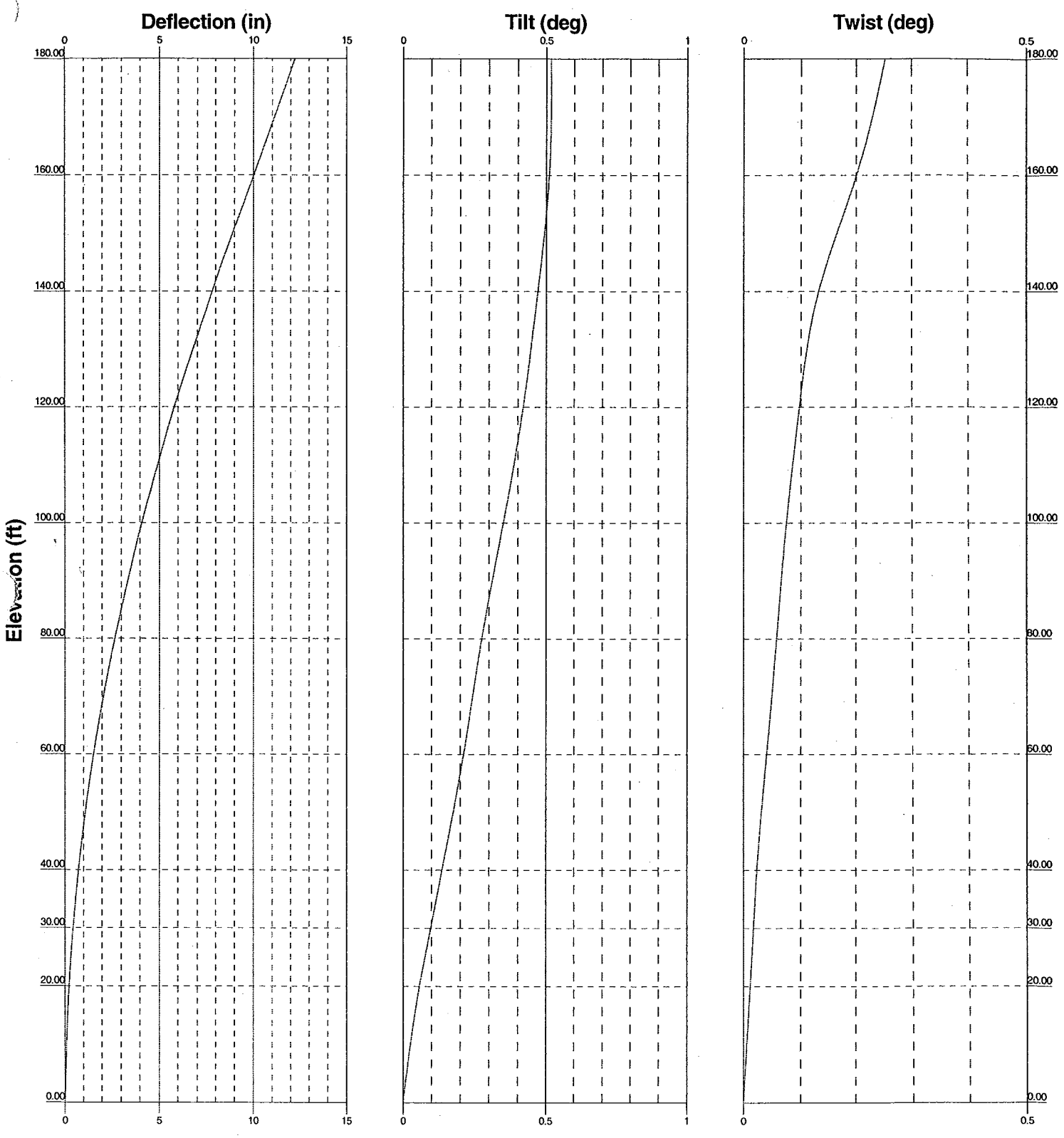
ERI TOWER DEFLECTION, TILT, AND TWIST

TIA/EIA-222-F - 90 mph/90 mph 0.5000 in Ice

Dead+Wind 120 deg+Ice



URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
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Job: ***180' Lattice Tower***			
Project: ***Westport, Connecticut***			
Client:	Drawn by: Jed Kiernan	App'd:	
Code: TIA/EIA-222-F	Date: 01/04/06	Scale: NT	
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ERI TOWER DETAILED OUTPUT

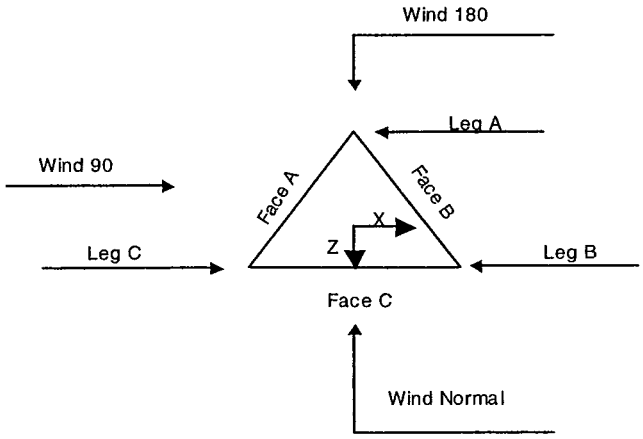
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.54 ft at the top and 27.68 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
Deflections calculated using a wind speed of 90 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	180.00-160.00			8.54	1	20.00
T2	160.00-140.00			8.63	1	20.00
T3	140.00-120.00			10.71	1	20.00
T4	120.00-100.00			12.79	1	20.00
T5	100.00-80.00			15.04	1	20.00
T6	80.00-60.00			17.58	1	20.00
T7	60.00-40.00			20.11	1	20.00
T8	40.00-30.00			22.64	1	10.00
T9	30.00-20.00			23.91	1	10.00
T10	20.00-0.00			25.18	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	140.00-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	120.00-100.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T5	100.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	40.00-30.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	30.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T10	20.00-0.00	20.00	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 160.00-140.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T4 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)
T5 100.00-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T6 80.00-60.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T7 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T8 40.00-30.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T9 30.00-20.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T10 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T9 30.00-20.00	Pipe	ROHN 2.5 STD	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-	None	Flat Bar		A36	Pipe	ROHN 1.5 STD	A572-50

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
160.00				(36 ksi)			(50 ksi)
T2 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 120.00-100.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T7 60.00-40.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T8 40.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T9 30.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T10 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 180.00-160.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T2 160.00-140.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T3 140.00-120.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T4 120.00-100.00	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-80.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 80.00-60.00	Solid Round		A36 (36 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T7 60.00-40.00	Single Angle		A36 (36 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 40.00-30.00	Solid Round		A36 (36 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 30.00-20.00	Solid Round		A36 (36 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T10 20.00-0.00	Solid Round		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T10 20.00-0.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	0.8
		Diagonal (1)	Pipe	ROHN 1.5 STD	0.8
		Hip (1)	Pipe	ROHN 1.5 STD	0.8

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 40.00-30.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 30.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.00-	Yes	Yes	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
40.00				1	1	1	1	1	1	1
T8 40.00-30.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 30.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 180.00-160.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-30.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 30.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Connection Offsets Diagonal Vert. Top in	Diagonal Horiz. Top in	Diagonal Vert. Bot. in	Diagonal Horiz. Bot. in	K-Bracing Vert. Top in	K-Bracing Horiz. Top in	K-Bracing Vert. Bot. in	K-Bracing Horiz. Bot. in
T1 180.00-160.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 160.00-140.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 140.00-120.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T4 120.00-100.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 100.00-80.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 80.00-60.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 60.00-40.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 40.00-30.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 30.00-20.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 20.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7/8 (State Police)	C	Yes	Ar (CfAe)	180.00 - 8.00	0.0000	-0.34	1	1	1.1100	1.1100		0.54
7/8 (State Police)	C	Yes	Ar (CfAe)	180.00 - 8.00	0.0000	-0.33	1	1	1.1100	1.1100		0.54
1 5/8 (AT&T Wireless)	B	Yes	Ar (CfAe)	140.00 - 8.00	0.0000	-0.44	9	9	1.0000	1.9800		1.04
1 1/4 (Cingular)	C	Yes	Ar (CfAe)	135.00 - 8.00	0.0000	0.46	12	12	1.5500	1.5500		0.66
1 5/8 (Verizon Wireless)	C	Yes	Ar (CfAe)	162.00 - 8.00	0.0000	-0.44	12	12	1.0000	1.9800		1.04
1 5/8 (T-Mobile)	A	Yes	Ar (CfAe)	125.00 - 8.00	0.0000	-0.44	12	6	1.9800	1.9800		1.04
1/2 (Verizon)	C	Yes	Ar (CfAe)	60.00 - 8.00	0.0000	-0.38	1	1	0.5800	0.5800		0.25
1 5/8 (State Police)	B	Yes	Ar (CfAe)	160.00 - 8.00	0.0000	-0.4	2	2	1.0000	1.9800		1.04
1 5/8 (State Police)	B	Yes	Ar (CfAe)	160.00 - 8.00	0.0000	-0.38	2	2	1.0000	1.9800		1.04
7/8 (State Police)	C	Yes	Ar (CfAe)	160.00 - 8.00	0.0000	0.39	2	2	1.1100	1.1100		0.54
7/8 (State Police)	C	Yes	Ar (CfAe)	169.00 - 8.00	0.0000	-0.36	1	1	1.1100	1.1100		0.54
7/8 (Verizon Wireless)	C	Yes	Ar (CfAe)	177.00 - 8.00	0.0000	-0.37	1	1	1.1100	1.1100		0.54
EW63 (State Police)	C	Yes	Ar (CfAe)	177.00 - 8.00	0.0000	-0.35	1	1	1.5742	1.5742		0.51

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	12.295	0.000	0.000	0.000	0.07
T2	160.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	13.200	0.000	0.000	0.000	0.08
		C	53.324	0.000	0.000	0.000	0.32
T3	140.00-120.00	A	4.950	0.000	0.000	0.000	0.06
		B	42.900	0.000	0.000	0.000	0.27
		C	76.574	0.000	0.000	0.000	0.44
T4	120.00-100.00	A	19.800	0.000	0.000	0.000	0.25
		B	42.900	0.000	0.000	0.000	0.27
		C	84.324	0.000	0.000	0.000	0.48
T5	100.00-80.00	A	19.800	0.000	0.000	0.000	0.25
		B	42.900	0.000	0.000	0.000	0.27
		C	84.324	0.000	0.000	0.000	0.48
T6	80.00-60.00	A	19.800	0.000	0.000	0.000	0.25
		B	42.900	0.000	0.000	0.000	0.27
		C	84.324	0.000	0.000	0.000	0.48
T7	60.00-40.00	A	19.800	0.000	0.000	0.000	0.25
		B	42.900	0.000	0.000	0.000	0.27
		C	85.290	0.000	0.000	0.000	0.49
T8	40.00-30.00	A	9.900	0.000	0.000	0.000	0.12
		B	21.450	0.000	0.000	0.000	0.14
		C	42.645	0.000	0.000	0.000	0.24
T9	30.00-20.00	A	9.900	0.000	0.000	0.000	0.12
		B	21.450	0.000	0.000	0.000	0.14
		C	42.645	0.000	0.000	0.000	0.24
T10	20.00-0.00	A	11.880	0.000	0.000	0.000	0.15
		B	25.740	0.000	0.000	0.000	0.16
		C	51.174	0.000	0.000	0.000	0.29

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		15.748	5.463	0.000	0.000	0.21
T2	160.00-140.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		9.933	9.933	0.000	0.000	0.23
		C		30.357	54.633	0.000	0.000	0.99
T3	140.00-120.00	A	0.500	7.450	0.000	0.000	0.000	0.15
		B		14.900	49.667	0.000	0.000	0.81
		C		68.607	54.633	0.000	0.000	1.34
T4	120.00-100.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.900	49.667	0.000	0.000	0.81
		C		81.357	54.633	0.000	0.000	1.45
T5	100.00-80.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.900	49.667	0.000	0.000	0.81
		C		81.357	54.633	0.000	0.000	1.45
T6	80.00-60.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.900	49.667	0.000	0.000	0.81
		C		81.357	54.633	0.000	0.000	1.45
T7	60.00-40.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.900	49.667	0.000	0.000	0.81
		C		83.990	54.633	0.000	0.000	1.47
T8	40.00-30.00	A	0.500	14.900	0.000	0.000	0.000	0.31

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		7.450	24.833	0.000	0.000	0.41
		C		41.995	27.317	0.000	0.000	0.74
T9	30.00-20.00	A	0.500	14.900	0.000	0.000	0.000	0.31
		B		7.450	24.833	0.000	0.000	0.41
		C		41.995	27.317	0.000	0.000	0.74
T10	20.00-0.00	A	0.500	17.880	0.000	0.000	0.000	0.37
		B		8.940	29.800	0.000	0.000	0.49
		C		50.394	32.780	0.000	0.000	0.88

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.966	2.420	0.000	0.000
T2	160.00-140.00	A	0.000	0.000	0.000	0.000
		B	0.967	2.118	0.000	0.000
		C	3.907	9.063	0.000	0.000
T3	140.00-120.00	A	0.366	0.783	0.000	0.000
		B	3.175	6.788	0.000	0.000
		C	5.667	12.957	0.000	0.000
T4	120.00-100.00	A	1.201	2.480	0.000	0.000
		B	2.603	5.373	0.000	0.000
		C	5.116	11.317	0.000	0.000
T5	100.00-80.00	A	1.286	2.568	0.000	0.000
		B	2.786	5.564	0.000	0.000
		C	5.476	11.718	0.000	0.000
T6	80.00-60.00	A	1.302	2.565	0.000	0.000
		B	2.822	5.557	0.000	0.000
		C	5.547	11.703	0.000	0.000
T7	60.00-40.00	A	1.366	2.640	0.000	0.000
		B	2.960	5.721	0.000	0.000
		C	5.886	12.283	0.000	0.000
T8	40.00-30.00	A	0.667	1.290	0.000	0.000
		B	1.446	2.796	0.000	0.000
		C	2.875	6.003	0.000	0.000
T9	30.00-20.00	A	0.659	1.274	0.000	0.000
		B	1.427	2.760	0.000	0.000
		C	2.837	5.926	0.000	0.000
T10	20.00-0.00	A	0.830	1.680	0.000	0.000
		B	1.799	3.640	0.000	0.000
		C	3.576	7.815	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-160.00	5.1701	4.0483	5.8246	4.6257
T2	160.00-140.00	14.7424	6.8093	13.8905	9.5560

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T3	140.00-120.00	4.6375	1.0598	3.0547	4.7516
T4	120.00-100.00	-1.5720	4.4398	-3.6538	8.6157
T5	100.00-80.00	-1.7402	4.9262	-4.0934	9.6688
T6	80.00-60.00	-1.7989	5.1020	-4.3398	10.2662
T7	60.00-40.00	-1.6512	5.7071	-4.1364	11.5402
T8	40.00-30.00	-1.7638	6.1037	-4.4207	12.3474
T9	30.00-20.00	-1.8363	6.3592	-4.6042	12.8685
T10	20.00-0.00	-1.4289	4.9514	-3.6714	10.2554

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	K
Rohn 12' T-Frame Sector Mount (Verizon)	A	From Leg	1.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Rohn 12' T-Frame Sector Mount (Verizon)	B	From Leg	1.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Rohn 12' T-Frame Sector Mount (Verizon)	C	From Leg	1.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
DB844H105ESX (Verizon)	A	From Leg	4.00 6.00 0.00	0.0000	162.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	0.01 0.04
DB844H105ESX (Verizon)	A	From Leg	4.00 -6.00 0.00	0.0000	162.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	0.01 0.04
LPA-185063/8CFx2 (Verizon)	A	From Leg	4.00 4.00 0.00	0.0000	162.00	No Ice 1/2" Ice	3.04 3.38	2.73 3.04	0.01 0.03
LPA-185063/8CFx2 (Verizon)	A	From Leg	4.00 -4.00 0.00	0.0000	162.00	No Ice 1/2" Ice	3.04 3.38	2.73 3.04	0.01 0.03
DB844H105ESX (Verizon)	B	From Leg	4.00 6.00 0.00	0.0000	162.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	0.01 0.04
DB844H105ESX (Verizon)	B	From Leg	4.00 -6.00 0.00	0.0000	162.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	0.01 0.04
LPA-185063/8CFx2 (Verizon)	B	From Leg	4.00 4.00 0.00	0.0000	162.00	No Ice 1/2" Ice	3.04 3.38	2.73 3.04	0.01 0.03
LPA-185063/8CFx2 (Verizon)	B	From Leg	4.00 -4.00 0.00	0.0000	162.00	No Ice 1/2" Ice	3.04 3.38	2.73 3.04	0.01 0.03
DB844H105ESX (Verizon)	C	From Leg	4.00 6.00 0.00	0.0000	162.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	0.01 0.04
DB844H105ESX (Verizon)	C	From Leg	4.00 -6.00	0.0000	162.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	0.01 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
LPA-185063/8CFx2	C	From Leg	4.00	0.0000	162.00	No Ice	3.04	2.73	0.01
(Verizon)			4.00			1/2" Ice	3.38	3.04	0.03
			0.00						
LPA-185063/8CFx2	C	From Leg	4.00	0.0000	162.00	No Ice	3.04	2.73	0.01
(Verizon)			-4.00			1/2" Ice	3.38	3.04	0.03
			0.00						
Valmont 12' T-Frame Sector	A	From Leg	1.00	0.0000	140.00	No Ice	15.00	15.00	0.50
Mount			0.00			1/2" Ice	20.60	20.60	0.65
(Cingular BLUE)			0.00						
Valmont 12' T-Frame Sector	B	From Leg	1.00	0.0000	140.00	No Ice	15.00	15.00	0.50
Mount			0.00			1/2" Ice	20.60	20.60	0.65
(Cingular BLUE)			0.00						
Valmont 12' T-Frame Sector	C	From Leg	1.00	0.0000	140.00	No Ice	15.00	15.00	0.50
Mount			0.00			1/2" Ice	20.60	20.60	0.65
(Cingular BLUE)			0.00						
(3) 58010	A	From Leg	3.00	0.0000	140.00	No Ice	3.38	1.82	0.01
(Cingular BLUE)			0.00			1/2" Ice	3.72	2.15	0.03
			0.00						
(3) 58010	B	From Leg	3.00	0.0000	140.00	No Ice	3.38	1.82	0.01
(Cingular BLUE)			0.00			1/2" Ice	3.72	2.15	0.03
			0.00						
(3) 58010	C	From Leg	3.00	0.0000	140.00	No Ice	3.38	1.82	0.01
(Cingular BLUE)			0.00			1/2" Ice	3.72	2.15	0.03
			0.00						
TMA	A	From Leg	3.00	0.0000	140.00	No Ice	0.75	0.75	0.01
(Cingular BLUE)			0.00			1/2" Ice	1.00	1.00	0.01
			0.00						
TMA	B	From Leg	3.00	0.0000	140.00	No Ice	0.75	0.75	0.01
(Cingular BLUE)			0.00			1/2" Ice	1.00	1.00	0.01
			0.00						
(2) TMA	C	From Leg	3.00	0.0000	140.00	No Ice	0.75	0.75	0.01
(Cingular BLUE)			0.00			1/2" Ice	1.00	1.00	0.01
			0.00						
15' T-Frame Sector Mount	A	From Leg	1.00	0.0000	133.00	No Ice	15.00	15.00	0.50
(Cingular)			0.00			1/2" Ice	20.60	20.60	0.65
			0.00						
15' T-Frame Sector Mount	B	From Leg	1.00	0.0000	133.00	No Ice	15.00	15.00	0.50
(Cingular)			0.00			1/2" Ice	20.60	20.60	0.65
			0.00						
15' T-Frame Sector Mount	C	From Leg	1.00	0.0000	133.00	No Ice	15.00	15.00	0.50
(Cingular)			0.00			1/2" Ice	20.60	20.60	0.65
			0.00						
(2) 7770.00	A	From Leg	3.00	0.0000	133.00	No Ice	5.88	2.93	0.04
(Cingular)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) 7770.00	B	From Leg	3.00	0.0000	133.00	No Ice	5.88	2.93	0.04
(Cingular)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) 7770.00	C	From Leg	3.00	0.0000	133.00	No Ice	5.88	2.93	0.04
(Cingular)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) LPG13519 Diplexer	A	From Leg	3.00	0.0000	133.00	No Ice	0.27	0.18	0.01
(Cingular)			0.00			1/2" Ice	0.34	0.25	0.01
			0.00						
(2) LPG13519 Diplexer	B	From Leg	3.00	0.0000	133.00	No Ice	0.27	0.18	0.01
(Cingular)			0.00			1/2" Ice	0.34	0.25	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
(2) LPG13519 Diplexer	C	From Leg	3.00	0.0000	133.00	No Ice	0.27	0.18	0.01
(Cingular)			0.00			1/2" Ice	0.34	0.25	0.01
			0.00						
(2) LPG21401 TMA	A	From Leg	3.00	0.0000	133.00	No Ice	0.95	0.37	0.02
(Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LPG21401 TMA	B	From Leg	3.00	0.0000	133.00	No Ice	0.95	0.37	0.02
(Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LPG21401 TMA	C	From Leg	3.00	0.0000	133.00	No Ice	0.95	0.37	0.02
(Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
DR65-18-XXDPL2Q	A	From Leg	3.00	0.0000	126.00	No Ice	6.30	2.42	0.02
(T-Mobile)			0.00			1/2" Ice	6.73	2.76	0.06
			0.00						
DR65-18-XXDPL2Q	B	From Leg	3.00	0.0000	126.00	No Ice	6.30	2.42	0.02
(T-Mobile)			0.00			1/2" Ice	6.73	2.76	0.06
			0.00						
DR65-18-XXDPL2Q	C	From Leg	3.00	0.0000	126.00	No Ice	6.30	2.42	0.02
(T-Mobile)			0.00			1/2" Ice	6.73	2.76	0.06
			0.00						
OGT9-806	A	From Leg	3.00	0.0000	160.00	No Ice	2.15	2.15	0.02
(State Police)			0.00			1/2" Ice	3.25	3.25	0.03
			0.00						
OGT9-806	A	From Leg	3.00	0.0000	160.00	No Ice	2.15	2.15	0.02
(State Police)			0.00			1/2" Ice	3.25	3.25	0.03
			0.00						
AP11-850	B	From Leg	3.00	0.0000	160.00	No Ice	4.96	2.25	0.01
(State Police)			0.00			1/2" Ice	5.36	2.57	0.04
			0.00						
AP11-850	B	From Leg	3.00	0.0000	160.00	No Ice	4.96	2.25	0.01
(State Police)			0.00			1/2" Ice	5.36	2.57	0.04
			0.00						
DB222	C	From Leg	3.00	0.0000	160.00	No Ice	1.60	1.60	0.02
(State Police)			0.00			1/2" Ice	2.88	2.88	0.02
			0.00						
DB536	C	From Leg	3.00	0.0000	160.00	No Ice	2.83	2.83	0.02
(State Police)			0.00			1/2" Ice	3.99	3.99	0.04
			0.00						
PD1142	B	From Leg	0.10	0.0000	180.00	No Ice	1.35	1.35	0.03
(State Police)			0.00			1/2" Ice	3.16	3.16	0.04
			0.00						
PD1142	C	From Leg	0.10	0.0000	180.00	No Ice	1.35	1.35	0.03
(State Police)			0.00			1/2" Ice	3.16	3.16	0.04
			0.00						
6' Side Mount Standoff	A	From Leg	1.00	0.0000	160.00	No Ice	4.97	4.97	0.07
(State Police)			0.00			1/2" Ice	6.12	6.12	0.13
			0.00						
6' Side Mount Standoff	B	From Leg	1.00	0.0000	160.00	No Ice	4.97	4.97	0.07
(State Police)			0.00			1/2" Ice	6.12	6.12	0.13
			0.00						
6' Side Mount Standoff	C	From Leg	1.00	0.0000	160.00	No Ice	4.97	4.97	0.07
(State Police)			0.00			1/2" Ice	6.12	6.12	0.13
			0.00						
GPS	C	From Leg	3.00	0.0000	60.00	No Ice	0.50	0.50	0.00
(Verizon)			0.00			1/2" Ice	1.00	1.00	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: Horz ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
3' Side Mount Standoff (Verizon)	C	From Leg	0.00 1.50 0.00 0.00			0.0000	60.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	0.05 0.09

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: Horz ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
PA6-85 (State Police)	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00			Worst		176.00	6.00	No Ice 1/2" Ice	28.27 29.07	0.23 0.27
P6-F9 (State Police)	C	Grid	From Leg	1.00 0.00 0.00			Worst		169.00	6.00	No Ice 1/2" Ice	28.27 29.07	0.20 0.24
PAR6-105 (Verizon Wireless)	B	Grid	From Leg	1.00 0.00 0.00			Worst		170.00	6.00	No Ice 1/2" Ice	28.27 29.07	0.20 0.24

Tower Pressures - No Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 180.00-160.00	170.00	1.597	33	177.503	A	0.000	24.699	11.667	47.24	0.000	0.000
					B	0.000	24.699		47.24		
					C	0.000	36.028		32.38		
T2 160.00-140.00	150.00	1.541	32	200.850	A	0.000	28.825	15.027	52.13	0.000	0.000
					B	0.000	41.058		36.60		
					C	0.000	78.241		19.21		
T3 140.00-120.00	130.00	1.48	31	244.294	A	0.000	39.980	18.577	46.47	0.000	0.000
					B	0.000	75.121		24.73		
					C	0.000	106.303		17.48		
T4 120.00-100.00	110.00	1.411	29	289.399	A	0.000	57.200	22.130	38.69	0.000	0.000
					B	0.000	78.898		28.05		
					C	0.000	117.809		18.78		
T5 100.00-80.00	90.00	1.332	28	337.234	A	0.000	61.443	22.142	36.04	0.000	0.000
					B	0.000	83.043		26.66		
					C	0.000	121.776		18.18		
T6 80.00-60.00	70.00	1.24	26	391.244	A	0.000	71.436	28.827	40.35	0.000	0.000
					B	0.000	93.016		30.99		

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	131.715		21.89		
T7 60.00-40.00	50.00	1.126	23	441.924	A	0.000	76.042	28.827	37.91	0.000	0.000
					B	0.000	97.548		29.55		
					C	0.000	137.013		21.04		
T8 40.00-30.00	35.00	1.017	21	239.967	A	0.000	38.980	14.413	36.98	0.000	0.000
					B	0.000	49.751		28.97		
					C	0.000	69.518		20.73		
T9 30.00-20.00	25.00	1	21	252.637	A	0.000	39.626	14.413	36.37	0.000	0.000
					B	0.000	50.408		28.59		
					C	0.000	70.193		20.53		
T10 20.00-0.00	10.00	1	21	542.943	A	0.000	70.115	28.825	41.11	0.000	0.000
					B	0.000	83.007		34.73		
					C	0.000	106.664		27.02		

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	33	0.5000	179.170	A	0.000	33.933	15.000	44.20	0.000	0.000
						B	0.000	33.933		44.20		
						C	5.463	47.262		28.45		
T2 160.00-140.00	150.00	1.541	32	0.5000	202.519	A	0.000	38.423	18.366	47.80	0.000	0.000
						B	9.933	46.238		32.70		
						C	54.633	59.717		16.06		
T3 140.00-120.00	130.00	1.48	31	0.5000	245.963	A	0.000	52.476	21.916	41.76	0.000	0.000
						B	49.667	53.920		21.16		
						C	54.633	101.459		14.04		
T4 120.00-100.00	110.00	1.411	29	0.5000	291.068	A	0.000	75.363	25.470	33.80	0.000	0.000
						B	49.667	57.570		23.75		
						C	54.633	118.083		14.75		
T5 100.00-80.00	90.00	1.332	28	0.5000	338.904	A	0.000	80.252	25.485	31.76	0.000	0.000
						B	49.667	62.356		22.75		
						C	54.633	122.659		14.37		
T6 80.00-60.00	70.00	1.24	26	0.5000	392.914	A	0.000	90.928	32.169	35.38	0.000	0.000
						B	49.667	73.036		26.22		
						C	54.633	133.346		17.11		
T7 60.00-40.00	50.00	1.126	23	0.5000	443.594	A	0.000	96.244	32.169	33.42	0.000	0.000
						B	49.667	78.263		25.15		
						C	54.633	140.792		16.46		
T8 40.00-30.00	35.00	1.017	21	0.5000	240.802	A	0.000	49.375	16.085	32.58	0.000	0.000
						B	24.833	40.420		24.65		
						C	27.317	71.758		16.23		
T9 30.00-20.00	25.00	1	21	0.5000	253.472	A	0.000	50.218	16.085	32.03	0.000	0.000
						B	24.833	41.282		24.33		
						C	27.317	72.661		16.09		
T10 20.00-0.00	10.00	1	21	0.5000	544.613	A	0.000	87.905	32.167	36.59	0.000	0.000
						B	29.800	77.005		30.12		
						C	32.780	114.284		21.87		

Tower Pressure - Service

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	33	177.503	A	0.000	24.699	11.667	47.24	0.000	0.000
					B	0.000	24.699		47.24		
					C	0.000	36.028		32.38		
T2 160.00-140.00	150.00	1.541	32	200.850	A	0.000	28.825	15.027	52.13	0.000	0.000
					B	0.000	41.058		36.60		
					C	0.000	78.241		19.21		
T3 140.00-120.00	130.00	1.48	31	244.294	A	0.000	39.980	18.577	46.47	0.000	0.000
					B	0.000	75.121		24.73		
					C	0.000	106.303		17.48		
T4 120.00-100.00	110.00	1.411	29	289.399	A	0.000	57.200	22.130	38.69	0.000	0.000
					B	0.000	78.898		28.05		
					C	0.000	117.809		18.78		
T5 100.00-80.00	90.00	1.332	28	337.234	A	0.000	61.443	22.142	36.04	0.000	0.000
					B	0.000	83.043		26.66		
					C	0.000	121.776		18.18		
T6 80.00-60.00	70.00	1.24	26	391.244	A	0.000	71.436	28.827	40.35	0.000	0.000
					B	0.000	93.016		30.99		
					C	0.000	131.715		21.89		
T7 60.00-40.00	50.00	1.126	23	441.924	A	0.000	76.042	28.827	37.91	0.000	0.000
					B	0.000	97.548		29.55		
					C	0.000	137.013		21.04		
T8 40.00-30.00	35.00	1.017	21	239.967	A	0.000	38.980	14.413	36.98	0.000	0.000
					B	0.000	49.751		28.97		
					C	0.000	69.518		20.73		
T9 30.00-20.00	25.00	1	21	252.637	A	0.000	39.626	14.413	36.37	0.000	0.000
					B	0.000	50.408		28.59		
					C	0.000	70.193		20.53		
T10 20.00-0.00	10.00	1	21	542.943	A	0.000	70.115	28.825	41.11	0.000	0.000
					B	0.000	83.007		34.73		
					C	0.000	106.664		27.02		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	1	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	1	1	14.322			
			C	0.203	2.586	0.591	1	1	21.293			
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	1	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	1	1	24.278			
			C	0.39	2.085	0.647	1	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	1	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	1	1	46.442			
			C	0.435	1.999	0.667	1	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	1	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	1	1	47.963			
			C	0.407	2.05	0.655	1	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	1	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	1	1	49.902			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.361	2.146	0.637	1	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	1	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	1	1	55.701			
			C	0.337	2.203	0.628	1	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	1	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	1	1	58.026			
			C	0.31	2.27	0.619	1	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	1	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	1	1	29.449			
			C	0.29	2.324	0.613	1	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	1	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	1	1	29.756			
			C	0.278	2.357	0.609	1	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	1	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	1	1	48.303			
			C	0.196	2.608	0.59	1	1	62.898			
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	0.825	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	0.825	1	14.322			
			C	0.203	2.586	0.591	0.825	1	21.293			
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	0.825	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	0.825	1	24.278			
			C	0.39	2.085	0.647	0.825	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	0.825	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	0.825	1	46.442			
			C	0.435	1.999	0.667	0.825	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	0.825	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	0.825	1	47.963			
			C	0.407	2.05	0.655	0.825	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	0.825	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	0.825	1	49.902			
			C	0.361	2.146	0.637	0.825	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	0.825	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	0.825	1	55.701			
			C	0.337	2.203	0.628	0.825	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	0.825	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	0.825	1	58.026			
			C	0.31	2.27	0.619	0.825	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	0.825	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	0.825	1	29.449			
			C	0.29	2.324	0.613	0.825	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	0.825	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	0.825	1	29.756			
			C	0.278	2.357	0.609	0.825	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	0.825	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	0.825	1	48.303			
			C	0.196	2.608	0.59	0.825	1	62.898			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	0.8	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	0.8	1	14.322			
			C	0.203	2.586	0.591	0.8	1	21.293			
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	0.8	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	0.8	1	24.278			
			C	0.39	2.085	0.647	0.8	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	0.8	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	0.8	1	46.442			
			C	0.435	1.999	0.667	0.8	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	0.8	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	0.8	1	47.963			
			C	0.407	2.05	0.655	0.8	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	0.8	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	0.8	1	49.902			
			C	0.361	2.146	0.637	0.8	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	0.8	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	0.8	1	55.701			
			C	0.337	2.203	0.628	0.8	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	0.8	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	0.8	1	58.026			
			C	0.31	2.27	0.619	0.8	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	0.8	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	0.8	1	29.449			
			C	0.29	2.324	0.613	0.8	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	0.8	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	0.8	1	29.756			
			C	0.278	2.357	0.609	0.8	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	0.8	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	0.8	1	48.303			
			C	0.196	2.608	0.59	0.8	1	62.898			
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	0.85	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	0.85	1	14.322			
			C	0.203	2.586	0.591	0.85	1	21.293			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	0.85	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	0.85	1	24.278			
			C	0.39	2.085	0.647	0.85	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	0.85	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	0.85	1	46.442			
			C	0.435	1.999	0.667	0.85	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	0.85	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	0.85	1	47.963			
			C	0.407	2.05	0.655	0.85	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	0.85	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	0.85	1	49.902			
			C	0.361	2.146	0.637	0.85	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	0.85	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	0.85	1	55.701			
			C	0.337	2.203	0.628	0.85	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	0.85	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	0.85	1	58.026			
			C	0.31	2.27	0.619	0.85	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	0.85	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	0.85	1	29.449			
			C	0.29	2.324	0.613	0.85	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	0.85	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	0.85	1	29.756			
			C	0.278	2.357	0.609	0.85	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	0.85	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	0.85	1	48.303			
			C	0.196	2.608	0.59	0.85	1	62.898			
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.21	1.84	A	0.189	2.632	0.588	1	1	19.963	2.96	147.98	C
			B	0.189	2.632	0.588	1	1	19.963			
			C	0.294	2.311	0.614	1	1	34.490			
T2 160.00-140.00	1.23	2.15	A	0.19	2.631	0.588	1	1	22.606	6.45	322.50	C
			B	0.277	2.358	0.609	1	1	38.103			
			C	0.565	1.83	0.733	1	1	98.382			
T3 140.00-120.00	2.30	3.31	A	0.213	2.552	0.593	1	1	31.129	8.19	409.49	C
			B	0.421	2.024	0.66	1	1	85.279			
			C	0.635	1.787	0.775	1	1	133.304			
T4 120.00-100.00	2.88	3.73	A	0.259	2.411	0.604	1	1	45.533	8.49	424.31	C
			B	0.368	2.13	0.639	1	1	86.467			
			C	0.593	1.808	0.75	1	1	143.145			
T5 100.00-80.00	2.88	4.32	A	0.237	2.478	0.599	1	1	48.039	8.21	410.45	C
			B	0.331	2.218	0.626	1	1	88.684			
			C	0.523	1.872	0.71	1	1	141.668			
T6 80.00-60.00	2.88	5.21	A	0.231	2.494	0.597	1	1	54.312	8.13	406.44	C
			B	0.312	2.264	0.62	1	1	94.930			
			C	0.478	1.93	0.687	1	1	146.206			
T7 60.00-40.00	2.90	5.97	A	0.217	2.54	0.594	1	1	57.170	7.75	387.41	C
			B	0.288	2.327	0.612	1	1	97.597			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.441	1.989	0.669	1	1	148.821			
T8 40.00-30.00	1.45	3.11	A	0.205	2.579	0.591	1	1	29.203	3.59	359.13	C
			B	0.271	2.376	0.607	1	1	49.386			
			C	0.411	2.042	0.656	1	1	74.414			
T9 30.00-20.00	1.45	3.19	A	0.198	2.602	0.59	1	1	29.630	3.59	359.31	C
			B	0.261	2.405	0.605	1	1	49.796			
			C	0.394	2.075	0.649	1	1	74.499			
T10 20.00-0.00	1.74	6.31	A	0.161	2.73	0.583	1	1	51.274	5.65	282.44	C
			B	0.196	2.609	0.59	1	1	75.203			
			C	0.27	2.379	0.607	1	1	102.172			
Sum Weight:	19.91	39.14						OTM	5436.08 kip-ft	63.01		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.21	1.84	A	0.189	2.632	0.588	0.825	1	19.963	2.88	143.88	C
			B	0.189	2.632	0.588	0.825	1	19.963			
			C	0.294	2.311	0.614	0.825	1	33.534			
T2 160.00-140.00	1.23	2.15	A	0.19	2.631	0.588	0.825	1	22.606	5.82	291.16	C
			B	0.277	2.358	0.609	0.825	1	36.364			
			C	0.565	1.83	0.733	0.825	1	88.821			
T3 140.00-120.00	2.30	3.31	A	0.213	2.552	0.593	0.825	1	31.129	7.60	380.12	C
			B	0.421	2.024	0.66	0.825	1	76.587			
			C	0.635	1.787	0.775	0.825	1	123.743			
T4 120.00-100.00	2.88	3.73	A	0.259	2.411	0.604	0.825	1	45.533	7.92	395.97	C
			B	0.368	2.13	0.639	0.825	1	77.775			
			C	0.593	1.808	0.75	0.825	1	133.585			
T5 100.00-80.00	2.88	4.32	A	0.237	2.478	0.599	0.825	1	48.039	7.66	382.75	C
			B	0.331	2.218	0.626	0.825	1	79.993			
			C	0.523	1.872	0.71	0.825	1	132.108			
T6 80.00-60.00	2.88	5.21	A	0.231	2.494	0.597	0.825	1	54.312	7.60	379.87	C
			B	0.312	2.264	0.62	0.825	1	86.238			
			C	0.478	1.93	0.687	0.825	1	136.646			
T7 60.00-40.00	2.90	5.97	A	0.217	2.54	0.594	0.825	1	57.170	7.25	362.52	C
			B	0.288	2.327	0.612	0.825	1	88.905			
			C	0.441	1.989	0.669	0.825	1	139.260			
T8 40.00-30.00	1.45	3.11	A	0.205	2.579	0.591	0.825	1	29.203	3.36	336.06	C
			B	0.271	2.376	0.607	0.825	1	45.041			
			C	0.411	2.042	0.656	0.825	1	69.634			
T9 30.00-20.00	1.45	3.19	A	0.198	2.602	0.59	0.825	1	29.630	3.36	336.26	C
			B	0.261	2.405	0.605	0.825	1	45.451			
			C	0.394	2.075	0.649	0.825	1	69.718			
T10 20.00-0.00	1.74	6.31	A	0.161	2.73	0.583	0.825	1	51.274	5.33	266.59	C
			B	0.196	2.609	0.59	0.825	1	69.988			
			C	0.27	2.379	0.607	0.825	1	96.435			
Sum Weight:	19.91	39.14						OTM	5060.42 kip-ft	58.78		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.21	1.84	A	0.189	2.632	0.588	0.8	1	19.963	2.87	143.30	C
			B	0.189	2.632	0.588	0.8	1	19.963			
			C	0.294	2.311	0.614	0.8	1	33.397			
T2 160.00-140.00	1.23	2.15	A	0.19	2.631	0.588	0.8	1	22.606	5.73	286.69	C
			B	0.277	2.358	0.609	0.8	1	36.116			
			C	0.565	1.83	0.733	0.8	1	87.455			
T3 140.00-120.00	2.30	3.31	A	0.213	2.552	0.593	0.8	1	31.129	7.52	375.93	C
			B	0.421	2.024	0.66	0.8	1	75.345			
			C	0.635	1.787	0.775	0.8	1	122.377			
T4 120.00-100.00	2.88	3.73	A	0.259	2.411	0.604	0.8	1	45.533	7.84	391.92	C
			B	0.368	2.13	0.639	0.8	1	76.533			
			C	0.593	1.808	0.75	0.8	1	132.219			
T5 100.00-80.00	2.88	4.32	A	0.237	2.478	0.599	0.8	1	48.039	7.58	378.80	C
			B	0.331	2.218	0.626	0.8	1	78.751			
			C	0.523	1.872	0.71	0.8	1	130.742			
T6 80.00-60.00	2.88	5.21	A	0.231	2.494	0.597	0.8	1	54.312	7.52	376.07	C
			B	0.312	2.264	0.62	0.8	1	84.996			
			C	0.478	1.93	0.687	0.8	1	135.280			
T7 60.00-40.00	2.90	5.97	A	0.217	2.54	0.594	0.8	1	57.170	7.18	358.97	C
			B	0.288	2.327	0.612	0.8	1	87.663			
			C	0.441	1.989	0.669	0.8	1	137.894			
T8 40.00-30.00	1.45	3.11	A	0.205	2.579	0.591	0.8	1	29.203	3.33	332.76	C
			B	0.271	2.376	0.607	0.8	1	44.420			
			C	0.411	2.042	0.656	0.8	1	68.951			
T9 30.00-20.00	1.45	3.19	A	0.198	2.602	0.59	0.8	1	29.630	3.33	332.96	C
			B	0.261	2.405	0.605	0.8	1	44.830			
			C	0.394	2.075	0.649	0.8	1	69.036			
T10 20.00-0.00	1.74	6.31	A	0.161	2.73	0.583	0.8	1	51.274	5.29	264.32	C
			B	0.196	2.609	0.59	0.8	1	69.243			
			C	0.27	2.379	0.607	0.8	1	95.616			
Sum Weight:	19.91	39.14						OTM	5006.76 kip-ft	58.18		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.21	1.84	A	0.189	2.632	0.588	0.85	1	19.963	2.89	144.47	C
			B	0.189	2.632	0.588	0.85	1	19.963			
			C	0.294	2.311	0.614	0.85	1	33.670			
T2 160.00-140.00	1.23	2.15	A	0.19	2.631	0.588	0.85	1	22.606	5.91	295.64	C
			B	0.277	2.358	0.609	0.85	1	36.613			
			C	0.565	1.83	0.733	0.85	1	90.187			
T3 140.00-120.00	2.30	3.31	A	0.213	2.552	0.593	0.85	1	31.129	7.69	384.32	C
			B	0.421	2.024	0.66	0.85	1	77.829			
			C	0.635	1.787	0.775	0.85	1	125.109			
T4 120.00-100.00	2.88	3.73	A	0.259	2.411	0.604	0.85	1	45.533	8.00	400.01	C
			B	0.368	2.13	0.639	0.85	1	79.017			
			C	0.593	1.808	0.75	0.85	1	134.950			
T5 100.00-80.00	2.88	4.32	A	0.237	2.478	0.599	0.85	1	48.039	7.73	386.71	C
			B	0.331	2.218	0.626	0.85	1	81.234			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.523	1.872	0.71	0.85	1	133.473			
T6 80.00-60.00	2.88	5.21	A	0.231	2.494	0.597	0.85	1	54.312	7.67	383.66	C
			B	0.312	2.264	0.62	0.85	1	87.480			
			C	0.478	1.93	0.687	0.85	1	138.011			
T7 60.00-40.00	2.90	5.97	A	0.217	2.54	0.594	0.85	1	57.170	7.32	366.08	C
			B	0.288	2.327	0.612	0.85	1	90.147			
			C	0.441	1.989	0.669	0.85	1	140.626			
T8 40.00-30.00	1.45	3.11	A	0.205	2.579	0.591	0.85	1	29.203	3.39	339.35	C
			B	0.271	2.376	0.607	0.85	1	45.661			
			C	0.411	2.042	0.656	0.85	1	70.317			
T9 30.00-20.00	1.45	3.19	A	0.198	2.602	0.59	0.85	1	29.630	3.40	339.55	C
			B	0.261	2.405	0.605	0.85	1	46.071			
			C	0.394	2.075	0.649	0.85	1	70.401			
T10 20.00-0.00	1.74	6.31	A	0.161	2.73	0.583	0.85	1	51.274	5.38	268.85	C
			B	0.196	2.609	0.59	0.85	1	70.733			
			C	0.27	2.379	0.607	0.85	1	97.255			
Sum Weight:	19.91	39.14						OTM	5114.09 kip-ft	59.38		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	1	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	1	1	14.322			
			C	0.203	2.586	0.591	1	1	21.293			
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	1	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	1	1	24.278			
			C	0.39	2.085	0.647	1	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	1	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	1	1	46.442			
			C	0.435	1.999	0.667	1	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	1	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	1	1	47.963			
			C	0.407	2.05	0.655	1	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	1	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	1	1	49.902			
			C	0.361	2.146	0.637	1	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	1	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	1	1	55.701			
			C	0.337	2.203	0.628	1	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	1	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	1	1	58.026			
			C	0.31	2.27	0.619	1	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	1	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	1	1	29.449			
			C	0.29	2.324	0.613	1	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	1	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	1	1	29.756			
			C	0.278	2.357	0.609	1	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	1	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	1	1	48.303			
			C	0.196	2.608	0.59	1	1	62.898			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	0.825	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	0.825	1	14.322			
			C	0.203	2.586	0.591	0.825	1	21.293			
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	0.825	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	0.825	1	24.278			
			C	0.39	2.085	0.647	0.825	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	0.825	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	0.825	1	46.442			
			C	0.435	1.999	0.667	0.825	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	0.825	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	0.825	1	47.963			
			C	0.407	2.05	0.655	0.825	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	0.825	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	0.825	1	49.902			
			C	0.361	2.146	0.637	0.825	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	0.825	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	0.825	1	55.701			
			C	0.337	2.203	0.628	0.825	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	0.825	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	0.825	1	58.026			
			C	0.31	2.27	0.619	0.825	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	0.825	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	0.825	1	29.449			
			C	0.29	2.324	0.613	0.825	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	0.825	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	0.825	1	29.756			
			C	0.278	2.357	0.609	0.825	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	0.825	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	0.825	1	48.303			
			C	0.196	2.608	0.59	0.825	1	62.898			
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	0.8	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	0.8	1	14.322			
			C	0.203	2.586	0.591	0.8	1	21.293			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	0.8	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	0.8	1	24.278			
			C	0.39	2.085	0.647	0.8	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	0.8	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	0.8	1	46.442			
			C	0.435	1.999	0.667	0.8	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	0.8	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	0.8	1	47.963			
			C	0.407	2.05	0.655	0.8	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	0.8	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	0.8	1	49.902			
			C	0.361	2.146	0.637	0.8	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	0.8	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	0.8	1	55.701			
			C	0.337	2.203	0.628	0.8	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	0.8	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	0.8	1	58.026			
			C	0.31	2.27	0.619	0.8	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	0.8	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	0.8	1	29.449			
			C	0.29	2.324	0.613	0.8	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	0.8	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	0.8	1	29.756			
			C	0.278	2.357	0.609	0.8	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	0.8	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	0.8	1	48.303			
			C	0.196	2.608	0.59	0.8	1	62.898			
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 180.00-160.00	0.07	1.25	A	0.139	2.812	0.58	0.85	1	14.322	2.04	102.22	C
			B	0.139	2.812	0.58	0.85	1	14.322			
			C	0.203	2.586	0.591	0.85	1	21.293			
T2 160.00-140.00	0.41	1.50	A	0.144	2.796	0.581	0.85	1	16.733	3.78	189.17	C
			B	0.204	2.581	0.591	0.85	1	24.278			
			C	0.39	2.085	0.647	0.85	1	50.653			
T3 140.00-120.00	0.78	2.53	A	0.164	2.722	0.584	0.85	1	23.335	4.87	243.50	C
			B	0.308	2.276	0.618	0.85	1	46.442			
			C	0.435	1.999	0.667	0.85	1	70.858			
T4 120.00-100.00	1.00	2.93	A	0.198	2.604	0.59	0.85	1	33.743	5.18	259.14	C
			B	0.273	2.371	0.608	0.85	1	47.963			
			C	0.407	2.05	0.655	0.85	1	77.108			
T5 100.00-80.00	1.00	3.40	A	0.182	2.657	0.587	0.85	1	36.063	5.15	257.49	C
			B	0.246	2.449	0.601	0.85	1	49.902			
			C	0.361	2.146	0.637	0.85	1	77.511			
T6 80.00-60.00	1.00	4.10	A	0.183	2.655	0.587	0.85	1	41.933	5.25	262.45	C
			B	0.238	2.475	0.599	0.85	1	55.701			
			C	0.337	2.203	0.628	0.85	1	82.691			
T7 60.00-40.00	1.01	4.70	A	0.172	2.692	0.585	0.85	1	44.492	5.04	251.90	C
			B	0.221	2.528	0.595	0.85	1	58.026			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.31	2.27	0.619	0.85	1	84.814			
T8 40.00-30.00	0.50	2.44	A	0.162	2.726	0.583	0.85	1	22.743	2.34	233.99	C
			B	0.207	2.572	0.592	0.85	1	29.449			
			C	0.29	2.324	0.613	0.85	1	42.601			
T9 30.00-20.00	0.50	2.50	A	0.157	2.746	0.583	0.85	1	23.084	2.34	234.28	C
			B	0.2	2.598	0.59	0.85	1	29.756			
			C	0.278	2.357	0.609	0.85	1	42.773			
T10 20.00-0.00	0.60	5.11	A	0.129	2.85	0.579	0.85	1	40.562	3.81	190.62	C
			B	0.153	2.761	0.582	0.85	1	48.303			
			C	0.196	2.608	0.59	0.85	1	62.898			
Sum Weight:	6.88	30.44						OTM	3379.67 kip-ft	39.81		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	14.03					
Bracing Weight	16.41					
Total Member Self-Weight	30.44			9.76	6.67	
Total Weight	43.57			9.76	6.67	
Wind 0 deg - No Ice		0.00	-53.43	-5422.35	6.67	-3.38
Wind 30 deg - No Ice		26.71	-46.27	-4694.59	-2709.38	9.78
Wind 45 deg - No Ice		37.78	-37.78	-3831.32	-3834.41	15.58
Wind 60 deg - No Ice		46.27	-26.71	-2706.30	-4697.68	20.32
Wind 90 deg - No Ice		53.43	0.00	9.76	-5425.44	25.42
Wind 120 deg - No Ice		46.27	26.71	2725.82	-4697.68	23.70
Wind 135 deg - No Ice		37.78	37.78	3850.85	-3834.41	20.36
Wind 150 deg - No Ice		26.71	46.27	4714.12	-2709.38	15.64
Wind 180 deg - No Ice		0.00	53.43	5441.88	6.67	3.38
Wind 210 deg - No Ice		-26.71	46.27	4714.12	2722.73	-9.78
Wind 225 deg - No Ice		-37.78	37.78	3850.85	3847.76	-15.58
Wind 240 deg - No Ice		-46.27	26.71	2725.82	4711.03	-20.32
Wind 270 deg - No Ice		-53.43	0.00	9.76	5438.79	-25.42
Wind 300 deg - No Ice		-46.27	-26.71	-2706.30	4711.03	-23.70
Wind 315 deg - No Ice		-37.78	-37.78	-3831.32	3847.76	-20.36
Wind 330 deg - No Ice		-26.71	-46.27	-4694.59	2722.73	-15.64
Member Ice	8.70					
Total Weight Ice	67.91			22.16	6.57	
Wind 0 deg - Ice		0.00	-81.80	-8279.72	6.57	-12.70
Wind 30 deg - Ice		39.09	-67.71	-6888.63	-3983.38	20.80
Wind 45 deg - Ice		54.86	-54.86	-5582.53	-5598.12	35.62
Wind 60 deg - Ice		66.66	-38.49	-3914.12	-6811.28	47.85
Wind 90 deg - Ice		78.18	0.00	22.16	-7973.33	63.47
Wind 120 deg - Ice		70.84	40.90	4173.11	-7183.07	63.77
Wind 135 deg - Ice		54.86	54.86	5626.86	-5598.12	53.47
Wind 150 deg - Ice		39.09	67.71	6932.96	-3983.38	42.67
Wind 180 deg - Ice		0.00	76.97	7894.73	6.57	12.60
Wind 210 deg - Ice		-39.09	67.71	6932.96	3996.52	-20.80
Wind 225 deg - Ice		-54.86	54.86	5626.86	5611.27	-35.62
Wind 240 deg - Ice		-70.84	40.90	4173.11	7196.22	-51.07
Wind 270 deg - Ice		-78.18	0.00	22.16	7986.47	-63.47
Wind 300 deg - Ice		-66.66	-38.49	-3914.12	6824.42	-60.45
Wind 315 deg - Ice		-54.86	-54.86	-5582.53	5611.27	-53.47

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 330 deg - Ice		-39.09	-67.71	-6888.63	3996.52	-42.67
Total Weight	43.57			9.76	6.67	
Wind 0 deg - Service		0.00	-53.43	-5429.80	1.97	-3.38
Wind 30 deg - Service		26.71	-46.27	-4702.03	-2714.09	9.78
Wind 45 deg - Service		37.78	-37.78	-3838.77	-3839.12	15.58
Wind 60 deg - Service		46.27	-26.71	-2713.74	-4702.39	20.32
Wind 90 deg - Service		53.43	0.00	2.32	-5430.15	25.42
Wind 120 deg - Service		46.27	26.71	2718.38	-4702.39	23.70
Wind 135 deg - Service		37.78	37.78	3843.41	-3839.12	20.36
Wind 150 deg - Service		26.71	46.27	4706.67	-2714.09	15.64
Wind 180 deg - Service		0.00	53.43	5434.44	1.97	3.38
Wind 210 deg - Service		-26.71	46.27	4706.67	2718.03	-9.78
Wind 225 deg - Service		-37.78	37.78	3843.41	3843.05	-15.58
Wind 240 deg - Service		-46.27	26.71	2718.38	4706.32	-20.32
Wind 270 deg - Service		-53.43	0.00	2.32	5434.08	-25.42
Wind 300 deg - Service		-46.27	-26.71	-2713.74	4706.32	-23.70
Wind 315 deg - Service		-37.78	-37.78	-3838.77	3843.05	-20.36
Wind 330 deg - Service		-26.71	-46.27	-4702.03	2718.03	-15.64

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice
19	Dead+Wind 0 deg+Ice
20	Dead+Wind 30 deg+Ice
21	Dead+Wind 45 deg+Ice
22	Dead+Wind 60 deg+Ice
23	Dead+Wind 90 deg+Ice
24	Dead+Wind 120 deg+Ice
25	Dead+Wind 135 deg+Ice
26	Dead+Wind 150 deg+Ice
27	Dead+Wind 180 deg+Ice
28	Dead+Wind 210 deg+Ice
29	Dead+Wind 225 deg+Ice
30	Dead+Wind 240 deg+Ice
31	Dead+Wind 270 deg+Ice
32	Dead+Wind 300 deg+Ice
33	Dead+Wind 315 deg+Ice

Comb. No.	Description
34	Dead+Wind 330 deg+Ice
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	27	3.84	-1.00	0.08
			Max. Compression	30	-6.13	0.84	-0.04
			Max. Mx	22	3.17	1.03	-0.33
			Max. My	21	-0.80	0.26	1.58
			Max. Vy	32	0.95	-0.84	-0.05
			Max. Vx	25	1.05	-0.26	-1.16
		Diagonal	Max Tension	23	7.33	0.00	0.00
			Max. Compression	23	-7.42	0.00	0.00
			Max. Mx	18	-0.03	0.02	0.00
			Max. Vy	18	-0.01	0.00	0.00
		Horizontal	Max Tension	32	4.10	-0.01	0.00
			Max. Compression	24	-4.07	0.00	0.00
			Max. Mx	27	-0.44	-0.01	-0.01
			Max. My	22	-1.63	-0.01	-0.01
			Max. Vy	27	0.01	-0.01	-0.01
			Max. Vx	22	0.00	-0.01	-0.01
		Top Girt	Max Tension	33	0.38	-0.01	0.00
			Max. Compression	25	-0.38	0.00	0.00
			Max. Mx	27	0.03	-0.01	-0.00
			Max. My	19	0.25	-0.01	0.00
			Max. Vy	27	0.01	-0.01	-0.00
			Max. Vx	19	-0.00	-0.01	0.00
		Inner Bracing	Max Tension	24	0.07	0.00	0.00
			Max. Compression	24	-0.07	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. Vy	18	0.01	0.00	0.00
T2	160 - 140	Leg	Max Tension	27	30.79	-0.19	0.06
			Max. Compression	24	-36.85	0.11	-0.05
			Max. Mx	30	-13.92	0.84	-0.04
			Max. My	23	-1.36	-0.00	0.85
			Max. Vy	32	-0.72	-0.84	-0.05
			Max. Vx	20	-0.84	-0.00	-0.77
		Diagonal	Max Tension	31	9.75	0.00	0.00
			Max. Compression	31	-9.87	0.00	0.00
			Max. Mx	18	-0.01	0.03	0.00
			Max. Vy	18	0.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Horizontal	Max Tension	31	6.15	-0.01	0.00
			Max. Compression	31	-6.11	-0.01	0.00
			Max. Mx	27	-0.32	-0.02	-0.01
			Max. My	19	1.47	-0.01	0.01
			Max. Vy	27	-0.02	-0.02	-0.01
			Max. Vx	19	-0.00	-0.01	0.01
		Inner Bracing	Max Tension	31	0.11	0.00	0.00
			Max. Compression	31	-0.11	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. Vy	18	0.01	0.00	0.00
T3	140 - 120	Leg	Max Tension	27	66.16	-0.30	0.02
			Max. Compression	24	-80.41	0.69	-0.09
			Max. Mx	24	-80.41	0.69	-0.09
			Max. My	26	-5.99	-0.01	-0.71
			Max. Vy	32	-1.30	-0.33	0.01
			Max. Vx	28	1.26	-0.01	0.27
		Diagonal	Max Tension	31	14.16	0.00	0.00
			Max. Compression	31	-14.33	0.00	0.00
			Max. Mx	18	-0.04	0.05	0.00
			Max. Vy	18	-0.02	0.00	0.00
		Horizontal	Max Tension	31	9.87	-0.03	-0.00
			Max. Compression	31	-9.81	-0.03	-0.00
			Max. Mx	27	-0.42	-0.04	-0.02
			Max. My	19	1.04	-0.01	0.02
			Max. Vy	27	0.02	-0.04	-0.02
			Max. Vx	19	0.00	-0.01	0.02
		Inner Bracing	Max Tension	31	0.17	0.00	0.00
			Max. Compression	31	-0.17	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. Vy	18	0.01	0.00	0.00
T4	120 - 100	Leg	Max Tension	27	102.05	-0.57	-0.04
			Max. Compression	24	-121.51	0.61	-0.11
			Max. Mx	24	-97.04	0.69	-0.09
			Max. My	26	-6.47	-0.01	-0.71
			Max. Vy	22	-0.12	-0.68	-0.09
			Max. Vx	24	-0.16	-0.36	-0.68
		Diagonal	Max Tension	31	17.88	0.00	0.00
			Max. Compression	31	-18.14	0.00	0.00
			Max. Mx	18	-0.05	0.11	0.00
			Max. Vy	18	-0.04	0.00	0.00
		Horizontal	Max Tension	31	10.82	-0.04	-0.00
			Max. Compression	31	-10.76	-0.04	-0.00
			Max. Mx	27	-0.64	-0.06	-0.02
			Max. My	19	0.90	-0.01	0.02
			Max. Vy	27	-0.03	-0.06	-0.02
			Max. Vx	19	0.00	-0.01	0.02
		Inner Bracing	Max Tension	23	0.18	0.00	0.00
			Max. Compression	23	-0.19	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. Vy	18	0.02	0.00	0.00
T5	100 - 80	Leg	Max Tension	27	141.94	-0.59	-0.03
			Max. Compression	24	-168.20	0.91	-0.13
			Max. Mx	19	-167.07	0.91	0.03
			Max. My	26	-10.60	-0.02	-1.01
			Max. Vy	22	0.14	-0.91	-0.09
			Max. Vx	24	0.18	-0.49	-0.95
		Diagonal	Max Tension	31	17.17	0.00	0.00
			Max. Compression	31	-17.48	0.00	0.00
			Max. Mx	18	-0.07	0.15	0.00
			Max. Vy	18	-0.04	0.00	0.00
		Horizontal	Max Tension	31	11.44	-0.05	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	31	-11.36	-0.05	-0.00
			Max. Mx	27	-0.69	-0.07	-0.02
			Max. My	19	1.16	-0.02	0.02
			Max. Vy	27	-0.03	-0.07	-0.02
			Max. Vx	19	-0.00	-0.02	0.02
		Inner Bracing	Max Tension	23	0.19	0.00	0.00
			Max. Compression	23	-0.20	0.00	0.00
			Max. Mx	18	-0.00	-0.04	0.00
			Max. Vy	18	0.02	0.00	0.00
T6	80 - 60	Leg	Max Tension	27	178.68	-1.12	-0.03
			Max. Compression	24	-212.42	1.38	-0.10
			Max. Mx	19	-211.29	1.38	0.01
			Max. My	26	-13.39	-0.02	-1.39
			Max. Vy	22	0.15	-1.35	-0.09
			Max. Vx	24	0.18	-0.72	-1.29
		Diagonal	Max Tension	31	17.57	0.00	0.00
			Max. Compression	31	-17.99	0.00	0.00
			Max. Mx	18	-0.13	0.18	0.00
			Max. Vy	18	-0.05	0.00	0.00
		Horizontal	Max Tension	31	12.64	-0.09	-0.00
			Max. Compression	31	-12.49	-0.09	-0.00
			Max. Mx	27	-0.74	-0.13	-0.02
			Max. My	19	0.81	-0.04	0.03
			Max. Vy	27	-0.05	-0.13	-0.02
			Max. Vx	19	-0.00	-0.04	0.03
		Inner Bracing	Max Tension	31	0.21	0.00	0.00
			Max. Compression	31	-0.22	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. Vy	18	0.03	0.00	0.00
T7	60 - 40	Leg	Max Tension	27	214.19	-1.15	-0.02
			Max. Compression	30	-256.27	1.01	0.05
			Max. Mx	19	-232.72	1.38	0.01
			Max. My	26	-14.35	-0.02	-1.39
			Max. Vy	22	-0.20	-1.35	-0.09
			Max. Vx	34	0.28	-0.02	1.38
		Diagonal	Max Tension	23	18.17	0.00	0.00
			Max. Compression	23	-18.74	0.00	0.00
			Max. Mx	18	-0.20	0.25	0.00
			Max. Vy	18	-0.07	0.00	0.00
		Horizontal	Max Tension	23	13.92	0.00	0.00
			Max. Compression	23	-13.65	0.00	0.00
			Max. Mx	27	-0.74	-0.15	-0.02
			Max. My	19	0.74	-0.07	0.03
			Max. Vy	27	-0.06	-0.15	-0.02
			Max. Vx	19	0.00	-0.07	0.03
		Inner Bracing	Max Tension	31	0.23	0.00	0.00
			Max. Compression	31	-0.25	0.00	0.00
			Max. Mx	18	-0.01	-0.13	0.00
			Max. Vy	18	0.05	0.00	0.00
T8	40 - 30	Leg	Max Tension	27	231.50	-1.05	-0.02
			Max. Compression	30	-277.87	2.07	-0.01
			Max. Mx	24	-277.51	2.07	0.00
			Max. My	26	-17.55	-0.05	-1.30
			Max. Vy	19	-0.19	2.06	0.01
			Max. Vx	24	-0.20	-0.58	-1.20
		Diagonal	Max Tension	23	18.42	0.00	0.00
			Max. Compression	23	-19.04	0.00	0.00
			Max. Mx	18	-0.22	0.28	0.00
			Max. Vy	18	-0.07	0.00	0.00
		Horizontal	Max Tension	23	14.46	0.00	0.00
			Max. Compression	23	-14.17	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	27	-0.87	-0.16	-0.02
			Max. My	19	0.76	-0.10	0.02
			Max. Vy	27	-0.06	-0.16	-0.02
			Max. Vx	19	-0.00	-0.10	0.02
		Inner Bracing	Max Tension	23	0.24	0.00	0.00
			Max. Compression	23	-0.26	0.00	0.00
			Max. Mx	18	-0.01	-0.14	0.00
			Max. Vy	18	0.05	0.00	0.00
T9	30 - 20	Leg	Max Tension	27	248.47	-1.82	-0.01
			Max. Compression	30	-299.16	-2.30	0.24
			Max. Mx	30	-299.16	-2.30	0.24
			Max. My	26	-19.60	-0.49	-4.11
			Max. Vy	19	0.52	2.06	0.01
			Max. Vx	26	0.48	-0.49	-4.11
		Diagonal	Max Tension	23	18.59	0.00	0.00
			Max. Compression	23	-19.26	0.00	0.00
			Max. Mx	18	-0.24	0.30	0.00
			Max. Vy	18	-0.07	0.00	0.00
		Top Girt	Max Tension	23	14.98	0.00	0.00
			Max. Compression	23	-14.55	0.00	0.00
			Max. Mx	27	-0.21	-0.18	-0.02
			Max. My	19	0.18	-0.11	0.02
			Max. Vy	27	-0.06	-0.18	-0.02
			Max. Vx	19	0.00	-0.11	0.02
		Inner Bracing	Max Tension	31	0.25	0.00	0.00
			Max. Compression	31	-0.26	0.00	0.00
			Max. Mx	18	-0.01	-0.16	0.00
			Max. Vy	18	0.05	0.00	0.00
T10	20 - 0	Leg	Max Tension	27	263.35	1.29	-0.07
			Max. Compression	30	-319.30	0.00	0.00
			Max. Mx	30	-318.86	7.69	-0.35
			Max. My	26	-20.95	-0.49	-4.11
			Max. Vy	30	-1.08	7.69	-0.35
			Max. Vx	26	-0.80	-0.49	-4.11
		Diagonal	Max Tension	23	27.50	-0.23	0.06
			Max. Compression	23	-28.34	0.00	0.00
			Max. Mx	31	10.90	-0.30	0.06
			Max. My	30	-26.00	0.08	-0.09
			Max. Vy	31	-0.07	-0.30	0.06
			Max. Vx	30	-0.01	0.00	0.00
		Horizontal	Max Tension	23	15.66	0.00	0.00
			Max. Compression	23	-15.53	0.00	0.00
			Max. Mx	27	-0.82	-0.39	-0.05
			Max. My	19	1.58	-0.11	0.05
			Max. Vy	27	0.11	-0.39	-0.05
			Max. Vx	19	0.00	-0.11	0.05
		Redund Horz 1 Bracing	Max Tension	30	4.80	0.00	0.00
			Max. Compression	30	-4.80	0.00	0.00
			Max. Mx	18	0.30	0.02	0.00
			Max. Vy	18	-0.01	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	30	4.39	0.00	0.00
			Max. Compression	30	-4.39	0.00	0.00
			Max. Mx	18	0.28	0.03	0.00
			Max. Vy	18	-0.01	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	30	0.01	0.00	0.00
			Max. Compression	27	-0.02	0.00	0.00
			Max. Mx	18	-0.01	0.02	0.00
			Max. Vy	18	-0.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	23	0.26	0.00	0.00
			Max. Compression	23	-0.28	0.00	0.00
			Max. Mx	18	-0.01	0.11	0.00
			Max. Vy	18	-0.03	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	358.84	42.27	-23.16
	Max. H_x	30	358.84	42.27	-23.16
	Max. H_z	21	-286.29	-34.49	21.39
	Min. Vert	22	-295.07	-36.63	20.01
	Min. H_x	22	-295.07	-36.63	20.01
	Min. H_z	29	332.96	37.78	-23.26
Leg B	Max. Vert	24	358.37	-42.40	-22.92
	Max. H_x	32	-295.55	36.77	19.79
	Max. H_z	33	-286.76	34.68	21.07
	Min. Vert	32	-295.55	36.77	19.79
	Min. H_x	24	358.37	-42.40	-22.92
	Min. H_z	25	332.48	-37.96	-22.93
Leg A	Max. Vert	19	357.22	-0.27	48.16
	Max. H_x	31	21.71	6.50	1.86
	Max. H_z	19	357.22	-0.27	48.16
	Min. Vert	27	-296.70	0.26	-41.75
	Min. H_x	23	21.71	-6.51	1.86
	Min. H_z	27	-296.70	0.26	-41.75

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	43.57	0.00	0.00	9.76	6.67	0.00
Dead+Wind 0 deg - No Ice	43.57	0.00	-53.43	-5265.25	6.67	-3.38
Dead+Wind 30 deg - No Ice	43.57	26.71	-46.27	-4558.53	-2630.83	9.78
Dead+Wind 45 deg - No Ice	43.57	37.78	-37.78	-3720.24	-3723.32	15.58
Dead+Wind 60 deg - No Ice	43.57	46.27	-26.71	-2627.74	-4561.62	20.32
Dead+Wind 90 deg - No Ice	43.57	53.43	0.00	9.76	-5268.34	25.42
Dead+Wind 120 deg - No Ice	43.57	46.27	26.71	2647.27	-4561.62	23.70
Dead+Wind 135 deg - No Ice	43.57	37.78	37.78	3739.76	-3723.32	20.36
Dead+Wind 150 deg - No Ice	43.57	26.71	46.27	4578.06	-2630.83	15.64
Dead+Wind 180 deg - No Ice	43.57	0.00	53.43	5284.78	6.67	3.38
Dead+Wind 210 deg - No Ice	43.57	-26.71	46.27	4578.06	2644.18	-9.78
Dead+Wind 225 deg - No Ice	43.57	-37.78	37.78	3739.76	3736.67	-15.58
Dead+Wind 240 deg - No Ice	43.57	-46.27	26.71	2647.27	4574.97	-20.32
Dead+Wind 270 deg - No Ice	43.57	-53.43	0.00	9.76	5281.69	-25.42
Dead+Wind 300 deg - No Ice	43.57	-46.27	-26.71	-2627.74	4574.97	-23.70
Dead+Wind 315 deg - No Ice	43.57	-37.78	-37.78	-3720.24	3736.67	-20.36
Dead+Wind 330 deg - No Ice	43.57	-26.71	-46.27	-4558.53	2644.18	-15.64
Dead+Ice	67.91	0.00	0.00	22.16	6.57	0.00
Dead+Wind 0 deg+Ice	67.91	0.00	-81.80	-8019.53	6.57	-12.70

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg+Ice	67.91	39.09	-67.71	-6676.00	-3860.62	20.80
Dead+Wind 45 deg+Ice	67.91	54.86	-54.86	-5410.65	-5426.24	35.62
Dead+Wind 60 deg+Ice	67.91	66.66	-38.49	-3793.81	-6602.88	47.85
Dead+Wind 90 deg+Ice	67.91	78.18	0.00	22.16	-7727.80	63.47
Dead+Wind 120 deg+Ice	67.91	70.84	40.90	4043.01	-6957.74	63.77
Dead+Wind 135 deg+Ice	67.91	54.86	54.86	5454.97	-5426.24	53.47
Dead+Wind 150 deg+Ice	67.91	39.09	67.71	6720.33	-3860.62	42.67
Dead+Wind 180 deg+Ice	67.91	0.00	76.97	7654.10	6.57	12.60
Dead+Wind 210 deg+Ice	67.91	-39.09	67.71	6720.33	3873.76	-20.80
Dead+Wind 225 deg+Ice	67.91	-54.86	54.86	5454.97	5439.38	-35.62
Dead+Wind 240 deg+Ice	67.91	-70.84	40.90	4043.01	6970.88	-51.07
Dead+Wind 270 deg+Ice	67.91	-78.18	0.00	22.16	7740.95	-63.47
Dead+Wind 300 deg+Ice	67.91	-66.66	-38.49	-3793.81	6616.02	-60.45
Dead+Wind 315 deg+Ice	67.91	-54.86	-54.86	-5410.65	5439.38	-53.47
Dead+Wind 330 deg+Ice	67.91	-39.09	-67.71	-6676.00	3873.76	-42.67
Dead+Wind 0 deg - Service	43.57	0.00	-53.43	-5265.25	6.67	-3.38
Dead+Wind 30 deg - Service	43.57	26.71	-46.27	-4558.53	-2630.83	9.78
Dead+Wind 45 deg - Service	43.57	37.78	-37.78	-3720.24	-3723.32	15.58
Dead+Wind 60 deg - Service	43.57	46.27	-26.71	-2627.74	-4561.62	20.32
Dead+Wind 90 deg - Service	43.57	53.43	0.00	9.76	-5268.34	25.42
Dead+Wind 120 deg - Service	43.57	46.27	26.71	2647.27	-4561.62	23.70
Dead+Wind 135 deg - Service	43.57	37.78	37.78	3739.76	-3723.32	20.36
Dead+Wind 150 deg - Service	43.57	26.71	46.27	4578.06	-2630.83	15.64
Dead+Wind 180 deg - Service	43.57	0.00	53.43	5284.78	6.67	3.38
Dead+Wind 210 deg - Service	43.57	-26.71	46.27	4578.06	2644.18	-9.78
Dead+Wind 225 deg - Service	43.57	-37.78	37.78	3739.76	3736.67	-15.58
Dead+Wind 240 deg - Service	43.57	-46.27	26.71	2647.27	4574.97	-20.32
Dead+Wind 270 deg - Service	43.57	-53.43	0.00	9.76	5281.69	-25.42
Dead+Wind 300 deg - Service	43.57	-46.27	-26.71	-2627.74	4574.97	-23.70
Dead+Wind 315 deg - Service	43.57	-37.78	-37.78	-3720.24	3736.67	-20.36
Dead+Wind 330 deg - Service	43.57	-26.71	-46.27	-4558.53	2644.18	-15.64

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-43.57	0.00	0.00	43.57	0.00	0.000%
2	0.00	-43.57	-53.43	0.00	43.57	53.43	0.000%
3	26.71	-43.57	-46.27	-26.71	43.57	46.27	0.000%
4	37.78	-43.57	-37.78	-37.78	43.57	37.78	0.000%
5	46.27	-43.57	-26.71	-46.27	43.57	26.71	0.000%
6	53.43	-43.57	0.00	-53.43	43.57	0.00	0.000%
7	46.27	-43.57	26.71	-46.27	43.57	-26.71	0.000%
8	37.78	-43.57	37.78	-37.78	43.57	-37.78	0.000%
9	26.71	-43.57	46.27	-26.71	43.57	-46.27	0.000%
10	0.00	-43.57	53.43	0.00	43.57	-53.43	0.000%
11	-26.71	-43.57	46.27	26.71	43.57	-46.27	0.000%
12	-37.78	-43.57	37.78	37.78	43.57	-37.78	0.000%
13	-46.27	-43.57	26.71	46.27	43.57	-26.71	0.000%
14	-53.43	-43.57	0.00	53.43	43.57	0.00	0.000%
15	-46.27	-43.57	-26.71	46.27	43.57	26.71	0.000%
16	-37.78	-43.57	-37.78	37.78	43.57	37.78	0.000%
17	-26.71	-43.57	-46.27	26.71	43.57	46.27	0.000%
18	0.00	-67.91	0.00	0.00	67.91	0.00	0.000%
19	0.00	-67.91	-81.80	0.00	67.91	81.80	0.000%
20	39.09	-67.91	-67.71	-39.09	67.91	67.71	0.000%
21	54.86	-67.91	-54.86	-54.86	67.91	54.86	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
22	66.66	-67.91	-38.49	-66.66	67.91	38.49	0.000%
23	78.18	-67.91	0.00	-78.18	67.91	0.00	0.000%
24	70.84	-67.91	40.90	-70.84	67.91	-40.90	0.000%
25	54.86	-67.91	54.86	-54.86	67.91	-54.86	0.000%
26	39.09	-67.91	67.71	-39.09	67.91	-67.71	0.000%
27	0.00	-67.91	76.97	0.00	67.91	-76.97	0.000%
28	-39.09	-67.91	67.71	39.09	67.91	-67.71	0.000%
29	-54.86	-67.91	54.86	54.86	67.91	-54.86	0.000%
30	-70.84	-67.91	40.90	70.84	67.91	-40.90	0.000%
31	-78.18	-67.91	0.00	78.18	67.91	0.00	0.000%
32	-66.66	-67.91	-38.49	66.66	67.91	38.49	0.000%
33	-54.86	-67.91	-54.86	54.86	67.91	54.86	0.000%
34	-39.09	-67.91	-67.71	39.09	67.91	67.71	0.000%
35	0.00	-43.57	-53.43	0.00	43.57	53.43	0.000%
36	26.71	-43.57	-46.27	-26.71	43.57	46.27	0.000%
37	37.78	-43.57	-37.78	-37.78	43.57	37.78	0.000%
38	46.27	-43.57	-26.71	-46.27	43.57	26.71	0.000%
39	53.43	-43.57	0.00	-53.43	43.57	0.00	0.000%
40	46.27	-43.57	26.71	-46.27	43.57	-26.71	0.000%
41	37.78	-43.57	37.78	-37.78	43.57	-37.78	0.000%
42	26.71	-43.57	46.27	-26.71	43.57	-46.27	0.000%
43	0.00	-43.57	53.43	0.00	43.57	-53.43	0.000%
44	-26.71	-43.57	46.27	26.71	43.57	-46.27	0.000%
45	-37.78	-43.57	37.78	37.78	43.57	-37.78	0.000%
46	-46.27	-43.57	26.71	46.27	43.57	-26.71	0.000%
47	-53.43	-43.57	0.00	53.43	43.57	0.00	0.000%
48	-46.27	-43.57	-26.71	46.27	43.57	26.71	0.000%
49	-37.78	-43.57	-37.78	37.78	43.57	37.78	0.000%
50	-26.71	-43.57	-46.27	26.71	43.57	46.27	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	8.062	44	0.3419	0.1346
T2	160 - 140	6.604	44	0.3372	0.1075
T3	140 - 120	5.152	44	0.3087	0.0680
T4	120 - 100	3.818	44	0.2763	0.0474
T5	100 - 80	2.687	44	0.2294	0.0345
T6	80 - 60	1.750	44	0.1830	0.0240
T7	60 - 40	1.011	44	0.1382	0.0165
T8	40 - 30	0.473	44	0.0896	0.0105
T9	30 - 20	0.278	36	0.0644	0.0077
T10	20 - 0	0.134	36	0.0388	0.0050

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	PD1142	44	8.062	0.3419	0.1346	569995

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	PA6-85	44	7.771	0.3422	0.1301	569995
170.00	PAR6-105	44	7.334	0.3419	0.1228	284998
169.00	P6-F9	44	7.261	0.3417	0.1214	259089
162.00	Rohn 12' T-Frame Sector Mount	44	6.750	0.3387	0.1110	167899
160.00	OGT9-806	44	6.604	0.3372	0.1075	186861
140.00	Valmont 12' T-Frame Sector Mount	44	5.152	0.3087	0.0680	38689
133.00	15' T-Frame Sector Mount	44	4.666	0.2981	0.0585	29721
126.00	DR65-18-XXDPL2Q	44	4.199	0.2871	0.0519	24378
60.00	GPS	44	1.011	0.1382	0.0165	23596

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	12.221	24	0.5173	0.2684
T2	160 - 140	10.008	24	0.5116	0.2217
T3	140 - 120	7.809	30	0.4675	0.1490
T4	120 - 100	5.798	30	0.4177	0.1085
T5	100 - 80	4.090	30	0.3469	0.0810
T6	80 - 60	2.669	30	0.2774	0.0577
T7	60 - 40	1.544	30	0.2098	0.0402
T8	40 - 30	0.724	30	0.1363	0.0258
T9	30 - 20	0.426	19	0.0980	0.0190
T10	20 - 0	0.206	19	0.0590	0.0125

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	PD1142	24	12.221	0.5173	0.2684	461510
176.00	PA6-85	24	11.779	0.5181	0.2608	461510
170.00	PAR6-105	24	11.116	0.5183	0.2484	230755
169.00	P6-F9	24	11.006	0.5181	0.2462	209777
162.00	Rohn 12' T-Frame Sector Mount	24	10.230	0.5140	0.2279	137419
160.00	OGT9-806	24	10.008	0.5116	0.2217	160158
140.00	Valmont 12' T-Frame Sector Mount	30	7.809	0.4675	0.1490	24119
133.00	15' T-Frame Sector Mount	30	7.076	0.4510	0.1308	19212
126.00	DR65-18-XXDPL2Q	30	6.373	0.4342	0.1176	16094
60.00	GPS	30	1.544	0.2098	0.0402	15603

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8 K=1.00	21.168	2.2285	-6.13	47.17	0.130 ✔
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1 K=1.00	23.861	3.1741	-36.85	75.74	0.487 ✔
T3	140 - 120	ROHN 5 EH	20.04	6.68	43.6 K=1.00	25.320	6.1120	-80.41	154.75	0.520 ✔
T4	120 - 100	ROHN 6 EHS	20.04	10.02	54.0 K=1.00	23.709	6.7133	-121.51	159.16	0.763 ✔
T5	100 - 80	ROHN 6 EH	20.05	10.03	54.8 K=1.00	23.582	8.4049	-168.20	198.21	0.849 ✔
T6	80 - 60	ROHN 8 EHS	20.05	10.03	41.2 K=1.00	25.661	9.7193	-212.42	249.41	0.852 ✔
T7	60 - 40	ROHN 8 EHS	20.05	10.03	41.2 K=1.00	25.661	9.7193	-256.27	249.41	1.028 ✔
T8	40 - 30	ROHN 8 EHS	10.03	10.03	41.2 K=1.00	25.661	9.7193	-277.87	249.41	1.114 ✔
T9	30 - 20	ROHN 8 EHS	10.03	10.03	41.2 K=1.00	25.661	9.7193	-299.16	249.41	1.199 ✔
T10	20 - 0	ROHN 8 EH	20.05	10.03	41.8 K=1.00	25.576	12.7627	-319.30	326.43	0.978 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0 K=1.00	10.918	1.0745	-7.42	11.73	0.633 ✔
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8 K=1.00	9.431	1.0745	-9.87	10.13	0.974 ✔
T3	140 - 120	ROHN 2 EH	9.24	8.91	139.1 K=1.00	7.717	1.4807	-14.33	11.43	1.254 ✔
T4	120 - 100	ROHN 2.5 EH	12.52	12.06	156.6 K=1.00	6.090	2.2535	-18.14	13.72	1.322 ✔
T5	100 - 80	ROHN 3 STD	13.32	12.90	133.0 K=1.00	8.438	2.2285	-17.48	18.80	0.930 ✔
T6	80 - 60	ROHN 3 STD	14.19	13.68	141.1 K=1.00	7.504	2.2285	-17.99	16.72	1.076 ✔
T7	60 - 40	P3.5x.226	15.11	14.63	131.3 K=1.00	8.656	2.6795	-18.74	23.20	0.808 ✔
T8	40 - 30	P3.5x.226	15.59	15.12	135.8 K=1.00	8.103	2.6795	-19.04	21.71	0.877 ✔
T9	30 - 20	P3.5x.226	16.08	15.62	140.2 K=1.00	7.592	2.6795	-19.26	20.34	0.947 ✔
T10	20 - 0	P3.5x.226	24.33	12.17	109.2 K=1.00	12.519	2.6795	-28.34	33.55	0.845 ✔

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0 K=1.00	19.004	0.7995	-4.07	15.19	0.268 ✔
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9 K=1.00	16.309	0.7995	-6.11	13.04	0.468 ✔
T3	140 - 120	ROHN 2 STD	12.10	5.82	88.7 K=1.00	17.220	1.0745	-9.81	18.50	0.530 ✔
T4	120 - 100	ROHN 2 STD	13.92	6.68	101.9 K=1.00	14.269	1.0745	-10.76	15.33	0.702 ✔
T5	100 - 80	ROHN 2 STD	16.31	7.88	120.1 K=1.00	10.352	1.0745	-11.36	11.12	1.021 ✔
T6	80 - 60	ROHN 2.5 STD	18.84	9.06	114.8 K=1.00	11.336	1.7040	-12.49	19.32	0.646 ✔
T7	60 - 40	ROHN 2.5 STD	21.38	10.33	130.8 K=1.00	8.725	1.7040	-13.65	14.87	0.918 ✔
T8	40 - 30	ROHN 2.5 STD	22.64	10.96	138.8 K=1.00	7.746	1.7040	-14.17	13.20	1.073 ✔
T10	20 - 0	P3.5x.226	25.18	12.23	109.8 K=1.00	12.390	2.6795	-15.53	33.20	0.468 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5 K=1.00	19.110	0.7995	-0.38	15.28	0.025 ✔
T9	30 - 20	ROHN 2.5 STD	23.91	11.60	146.9 K=1.00	6.923	1.7040	-14.55	11.80	1.234 ✔

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	20 - 0	ROHN 1.5 STD	6.29	5.93	91.5 K=0.80	16.611	0.7995	-4.80	13.28	0.361 ✔

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	20 - 0	ROHN 1.5 STD	11.50	10.77	166.1 K=0.80	5.412	0.7995	-4.39	4.33	1.014 ✔

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	20 - 0	ROHN 1.5 STD	6.29	6.29	97.1 K=0.80	15.381	0.7995	-0.02	12.30	0.002 ✔

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	4.30	4.30	129.8 K=1.00	8.869	0.4844	-0.07	4.30	0.017 ✔
T2	160 - 140	L2x2x1/8	5.01	5.01	151.1 K=1.00	6.537	0.4844	-0.11	3.17	0.034 ✔
T3	140 - 120	L2x2x1/8	6.05	6.05	182.6 K=1.00	4.479	0.4844	-0.17	2.17	0.079 ✔
T4	120 - 100	L2 1/2x2 1/2x3/16	6.96	6.96	168.7 K=1.00	5.248	0.9020	-0.19	4.73	0.040 ✔
T5	100 - 80	L2 1/2x2 1/2x3/16	8.15	8.15	197.7 K=1.00	3.821	0.9020	-0.20	3.45	0.059 ✔
T6	80 - 60	L3x3x3/16	9.42	9.42	189.7 K=1.00	4.150	1.0900	-0.22	4.52	0.049 ✔
T7	60 - 40	L3 1/2x3 1/2x1/4	10.69	10.69	184.8 K=1.00	4.372	1.6900	-0.25	7.39	0.033 ✔
T8	40 - 30	L3 1/2x3 1/2x1/4	11.32	11.32	195.8 K=1.00	3.897	1.6900	-0.26	6.59	0.039 ✔
T9	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	206.7 K=1.00	3.495	1.6900	-0.26	5.91	0.045 ✔
T10	20 - 0	ROHN 2 STD	12.59	12.59	191.9 K=1.00	4.054	1.0745	-0.28	4.36	0.064 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8	30.000	2.2285	3.84	66.85	0.057 ✔
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1	30.000	3.1741	30.79	95.22	0.323 ✔
T3	140 - 120	ROHN 5 EH	20.04	6.68	43.6	30.000	6.1120	66.16	183.36	0.361 ✔
T4	120 - 100	ROHN 6 EHS	20.04	10.02	54.0	30.000	6.7133	102.06	201.40	0.507 ✔
T5	100 - 80	ROHN 6 EH	20.05	10.03	54.8	30.000	8.4049	141.94	252.15	0.563 ✔
T6	80 - 60	ROHN 8 EHS	20.05	10.03	41.2	30.000	9.7193	178.68	291.58	0.613 ✔
T7	60 - 40	ROHN 8 EHS	20.05	10.03	41.2	30.000	9.7193	214.19	291.58	0.735 ✔
T8	40 - 30	ROHN 8 EHS	10.03	10.03	41.2	30.000	9.7193	231.50	291.58	0.794 ✔
T9	30 - 20	ROHN 8 EHS	10.03	10.03	41.2	30.000	9.7193	248.47	291.58	0.852 ✔
T10	20 - 0	ROHN 8 EH	20.05	10.03	41.8	30.000	12.7627	263.35	382.88	0.688 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0	30.000	1.0745	7.33	32.24	0.227 ✔
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8	30.000	1.0745	9.75	32.24	0.302 ✔
T3	140 - 120	ROHN 2 EH	9.24	8.91	139.1	30.000	1.4807	14.16	44.42	0.319 ✔
T4	120 - 100	ROHN 2.5 EH	12.52	12.06	156.6	30.000	2.2535	17.88	67.61	0.264 ✔
T5	100 - 80	ROHN 3 STD	13.32	12.90	133.0	30.000	2.2285	17.17	66.85	0.257 ✔
T6	80 - 60	ROHN 3 STD	14.19	13.68	141.1	30.000	2.2285	17.57	66.85	0.263 ✔
T7	60 - 40	P3.5x.226	15.11	14.63	131.3	30.000	2.6795	18.17	80.39	0.226 ✔
T8	40 - 30	P3.5x.226	15.59	15.12	135.8	30.000	2.6795	18.42	80.39	0.229 ✔
T9	30 - 20	P3.5x.226	16.08	15.62	140.2	30.000	2.6795	18.59	80.39	0.231 ✔
T10	20 - 0	P3.5x.226	24.33	12.17	109.2	30.000	2.6795	27.50	80.39	0.342 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0	30.000	0.7995	4.10	23.98	0.171 ✔
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9	30.000	0.7995	6.15	23.98	0.256 ✔
T3	140 - 120	ROHN 2 STD	12.10	5.82	88.7	30.000	1.0745	9.87	32.24	0.306 ✔
T4	120 - 100	ROHN 2 STD	13.92	6.68	101.9	30.000	1.0745	10.82	32.24	0.336 ✔
T5	100 - 80	ROHN 2 STD	16.31	7.88	120.1	30.000	1.0745	11.44	32.24	0.355 ✔
T6	80 - 60	ROHN 2.5 STD	18.84	9.06	114.8	30.000	1.7040	12.64	51.12	0.247 ✔
T7	60 - 40	ROHN 2.5 STD	21.38	10.33	130.8	30.000	1.7040	13.92	51.12	0.272 ✔
T8	40 - 30	ROHN 2.5 STD	22.64	10.96	138.8	30.000	1.7040	14.46	51.12	0.283 ✔
T10	20 - 0	P3.5x.226	25.18	12.23	109.8	30.000	2.6795	15.66	80.39	0.195 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5	30.000	0.7995	0.38	23.98	0.016 ✔
T9	30 - 20	ROHN 2.5 STD	23.91	11.60	146.9	21.600	1.7040	14.98	36.81	0.407 ✔

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	20 - 0	ROHN 1.5 STD	6.29	5.93	114.4	30.000	0.7995	4.80	23.98	0.200 ✔

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	20 - 0	ROHN 1.5 STD	11.50	10.77	207.6	30.000	0.7995	4.39	23.98	0.183 ✔

Redundant Hip (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	20 - 0	ROHN 1.5 STD	6.29	6.29	121.3	30.000	0.7995	0.01	23.98	0.000 ✔

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	4.30	4.30	82.4	21.600	0.4844	0.07	10.46	0.007 ✔
T2	160 - 140	L2x2x1/8	5.01	5.01	95.9	21.600	0.4844	0.11	10.46	0.010 ✔
T3	140 - 120	L2x2x1/8	6.05	6.05	115.9	21.600	0.4844	0.17	10.46	0.016 ✔
T4	120 - 100	L2 1/2x2 1/2x3/16	6.96	6.96	107.3	21.600	0.9020	0.18	19.48	0.009 ✔
T5	100 - 80	L2 1/2x2 1/2x3/16	8.15	8.15	125.8	21.600	0.9020	0.19	19.48	0.010 ✔
T6	80 - 60	L3x3x3/16	9.42	9.42	120.4	21.600	1.0900	0.21	23.54	0.009 ✔
T7	60 - 40	L3 1/2x3 1/2x1/4	10.69	10.69	117.7	30.000	1.6900	0.23	50.70	0.005 ✔
T8	40 - 30	L3 1/2x3 1/2x1/4	11.32	11.32	124.6	30.000	1.6900	0.24	50.70	0.005 ✔
T9	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	131.6	30.000	1.6900	0.25	50.70	0.005 ✔
T10	20 - 0	ROHN 2 STD	12.59	12.59	191.9	30.000	1.0745	0.26	32.24	0.008 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 STD	1	-6.13	62.88	9.7	Pass
T2	160 - 140	Leg	ROHN 4 STD	41	-36.85	100.96	36.5	Pass
T3	140 - 120	Leg	ROHN 5 EH	80	-80.41	206.29	39.0	Pass
T4	120 - 100	Leg	ROHN 6 EHS	119	-121.51	212.17	57.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T5	100 - 80	Leg	ROHN 6 EH	146	-168.20	264.21	63.7	Pass
T6	80 - 60	Leg	ROHN 8 EHS	173	-212.42	332.46	63.9	Pass
T7	60 - 40	Leg	ROHN 8 EHS	199	-256.27	332.46	77.1	Pass
T8	40 - 30	Leg	ROHN 8 EHS	226	-277.87	332.46	83.6	Pass
T9	30 - 20	Leg	ROHN 8 EHS	241	-299.16	332.46	90.0	Pass
T10	20 - 0	Leg	ROHN 8 EH	256	-319.30	435.13	73.4	Pass
T1	180 - 160	Diagonal	ROHN 2 STD	9	-7.42	15.64	47.5	Pass
T2	160 - 140	Diagonal	ROHN 2 STD	44	-9.87	13.51	73.0	Pass
T3	140 - 120	Diagonal	ROHN 2 EH	83	-14.33	15.23	94.1	Pass
T4	120 - 100	Diagonal	ROHN 2.5 EH	122	-18.14	18.30	99.1	Pass
T5	100 - 80	Diagonal	ROHN 3 STD	149	-17.48	25.07	69.8	Pass
T6	80 - 60	Diagonal	ROHN 3 STD	176	-17.99	22.29	80.7	Pass
T7	60 - 40	Diagonal	P3.5x.226	204	-18.74	30.92	60.6	Pass
T8	40 - 30	Diagonal	P3.5x.226	231	-19.04	28.94	65.8	Pass
T9	30 - 20	Diagonal	P3.5x.226	248	-19.26	27.12	71.0	Pass
T10	20 - 0	Diagonal	P3.5x.226	263	-28.34	44.72	63.4	Pass
T1	180 - 160	Horizontal	ROHN 1.5 STD	7	-4.07	20.25	20.1	Pass
T2	160 - 140	Horizontal	ROHN 1.5 STD	43	-6.11	17.38	35.1	Pass
T3	140 - 120	Horizontal	ROHN 2 STD	82	-9.81	24.67	39.8	Pass
T4	120 - 100	Horizontal	ROHN 2 STD	121	-10.76	20.44	52.7	Pass
T5	100 - 80	Horizontal	ROHN 2 STD	148	-11.36	14.83	76.6	Pass
T6	80 - 60	Horizontal	ROHN 2.5 STD	175	-12.49	25.75	48.5	Pass
T7	60 - 40	Horizontal	ROHN 2.5 STD	202	-13.65	19.82	68.9	Pass
T8	40 - 30	Horizontal	ROHN 2.5 STD	229	-14.17	17.60	80.5	Pass
T10	20 - 0	Horizontal	P3.5x.226	259	-15.53	44.25	35.1	Pass
T1	180 - 160	Top Girt	ROHN 1.5 STD	4	-0.38	20.37	1.9	Pass
T9	30 - 20	Top Girt	ROHN 2.5 STD	244	-14.55	15.73	92.5	Pass
T10	20 - 0	Redund Horz 1 Bracing	ROHN 1.5 STD	261	-4.80	17.70	27.1	Pass
T10	20 - 0	Redund Diag 1 Bracing	ROHN 1.5 STD	280	-4.39	5.77	76.0	Pass
T10	20 - 0	Redund Hip 1 Bracing	ROHN 1.5 STD	281	-0.02	16.39	0.1	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	18	-0.07	5.73	1.2	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	52	-0.11	4.22	2.5	Pass
T3	140 - 120	Inner Bracing	L2x2x1/8	91	-0.17	2.89	6.0	Pass
T4	120 - 100	Inner Bracing	L2 1/2x2 1/2x3/16	130	-0.19	6.31	3.0	Pass
T5	100 - 80	Inner Bracing	L2 1/2x2 1/2x3/16	157	-0.20	4.59	4.4	Pass
T6	80 - 60	Inner Bracing	L3x3x3/16	184	-0.22	6.03	3.7	Pass
T7	60 - 40	Inner Bracing	L3 1/2x3 1/2x1/4	213	-0.25	9.85	2.5	Pass
T8	40 - 30	Inner Bracing	L3 1/2x3 1/2x1/4	240	-0.26	8.78	2.9	Pass
T9	30 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	255	-0.26	7.87	3.4	Pass
T10	20 - 0	Inner Bracing	ROHN 2 STD	285	-0.28	5.81	4.8	Pass
						Summary		
						Leg (T9)	90.0	Pass
						Diagonal (T4)	99.1	Pass
						Horizontal (T8)	80.5	Pass
						Top Girt (T9)	92.5	Pass
						Redund Horz 1 Bracing (T10)	27.1	Pass
						Redund Diag 1 Bracing (T10)	76.0	Pass
						Redund Hip 1 Bracing	0.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						(T10) Inner Bracing (T3)	6.0	Pass
						RATING =	**99.1**	**Pass**

Program Version 3.0.0.17 - 7/15/2004 File:N:/jkiernan/SAI-007/ERI Files/180' Self-Supported Lattice Tower.eri

ANCHOR BOLT EVALUATION

URS

Job	180' Self-Supported Tower	Project No.	SAI-007	Page	of
Description	Anchor Bolts and Base Plate Analysis	Computed by	JEK	Sheet 1	of 1
		Checked by		Date 01/04/06	

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

ALLOWABLE STRESS

$F_u := 125 \frac{10^3 \cdot lb}{in^2}$ A354 Gr. BC

Increase allowable by 1.333 per TIA/EIA

$Fy := 100 \frac{10^3 \cdot lb}{in^2}$ *

$n := 8$ n is the number of threads per inch

$Uplift := 297000 lb$ $Compression := 359000 lb$ $Shear := 48 lb$

$BoltDiamiter := 1 \cdot in$ $NumberOfBolts := 10$ $\mu := 0.55$ coefficient of friction

$$As1 := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \quad * \quad As1 = 2.73\,in^2$$

$$As2 := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \quad * \quad As2 = 2.11\,in^2$$

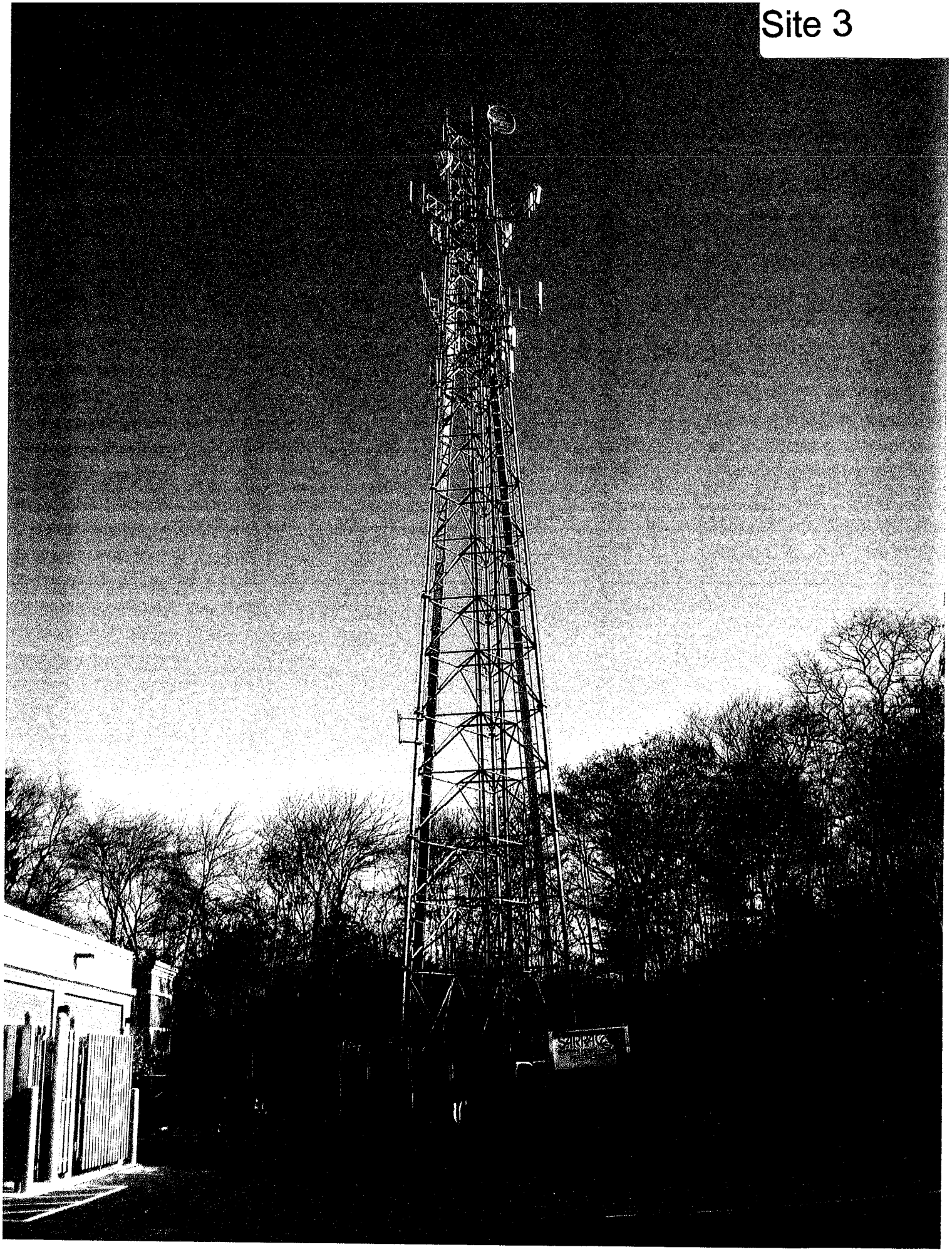
$$Anet := \frac{\pi}{4} \cdot \left(BoltDiamiter - \frac{0.9743 \cdot in}{n} \right)^2 \quad * \quad Anet = 0.61\,in^2$$

$$Aprovided := Anet \cdot NumberOfBolts \qquad Aprovided = 6.06\,in^2$$

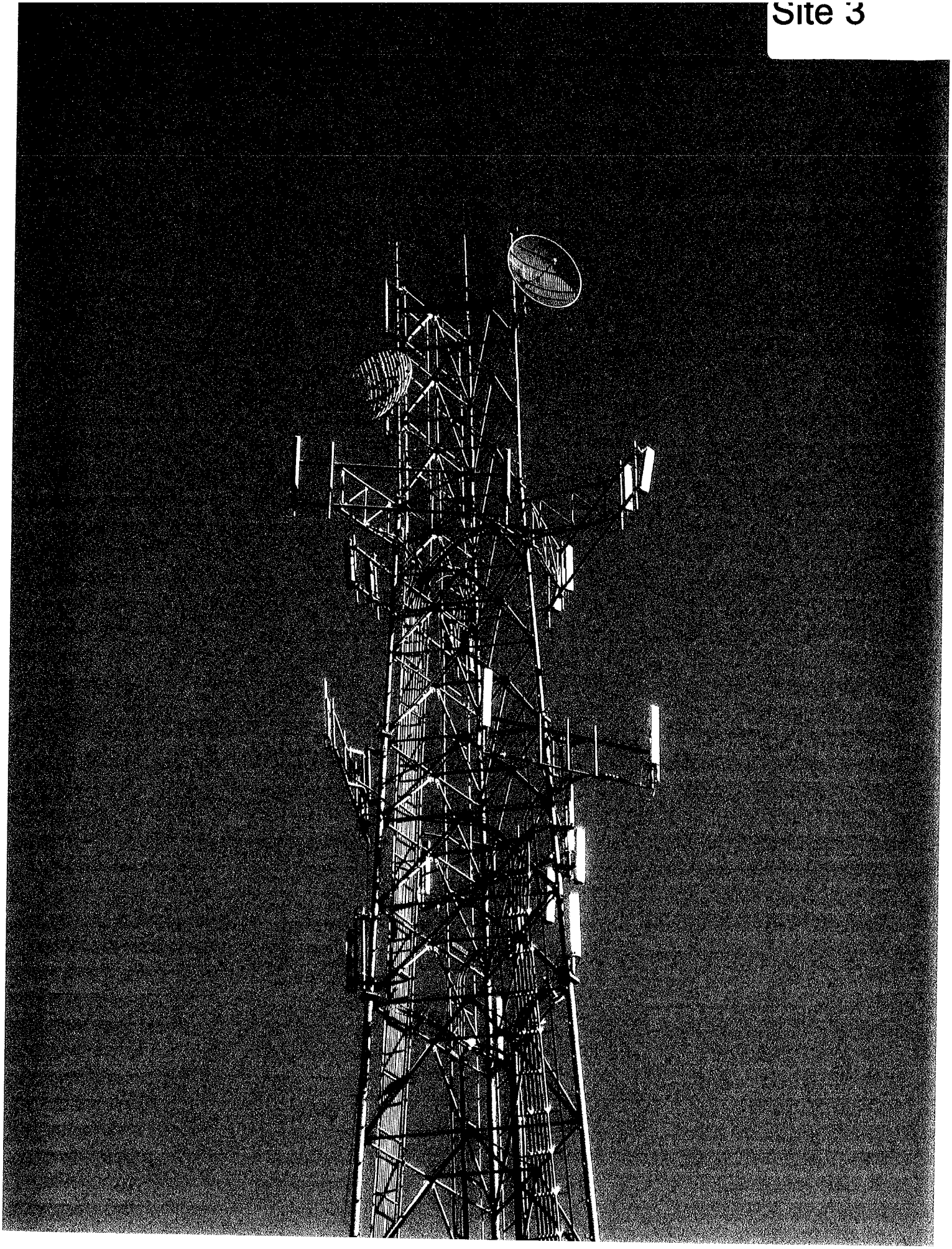
$$StressRatio1 := \frac{As1}{Aprovided} \qquad StressRatio1 = 0.45$$

Acceptable

$$StressRatio2 := \frac{As2}{Aprovided} \qquad StressRatio2 = 0.35$$


Site 3

Site 3



Letters to Chief Elected Officials

cingular
raising the bar

February 14, 2006

Honorable Jim Lash, First Selectman
Town of Greenwich
Town Hall, First Floor
101 Field Point Road
Greenwich, CT 06830

Re: **Notice of Exempt Modifications to Various Facilities in the Towns of Greenwich, Wilton and Westport, Connecticut**

Dear Mr. Lash,

As part of its merger and integration efforts, New Cingular Wireless PCS, LLC ("Cingular" or "the Company") intends to modify instrumentation and/or antenna configurations at certain wireless telecommunications facilities. As required by the Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review the Company's proposal. Please accept this letter and attachments as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter fully describes Cingular's proposal. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at (860) 301-6378 or Mr. Derek Phelps, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

David S. Malko, P.E.
Consultant for New Cingular Wireless

Enclosure

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raising the bar

February 14, 2006

Honorable William F. Brennan, First Selectman
Town of Wilton
Wilton Town Hall
238 Danbury Road
Wilton, CT 06897

Re: **Notice of Exempt Modifications to Various Facilities in the Towns of Greenwich, Wilton and Westport, Connecticut**

Dear Mr. Brennan,

As part of its merger and integration efforts, New Cingular Wireless PCS, LLC ("Cingular" or "the Company") intends to modify instrumentation and/or antenna configurations at certain wireless telecommunications facilities. As required by the Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review the Company's proposal. Please accept this letter and attachments as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

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Sincerely,

David S. Malko, P.E.
Consultant for New Cingular Wireless

Enclosure

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raising the bar

February 14, 2006

Honorable Gordon F. Joseloff, First Selectman
Town of Westport
Westport Town Hall
110 Myrtle Ave., Room 310
Westport, CT 06880

Re: **Notice of Exempt Modifications to Various Facilities in the Towns of Greenwich, Wilton and Westport, Connecticut**

Dear Mr. Joseloff,

As part of its merger and integration efforts, New Cingular Wireless PCS, LLC ("Cingular" or "the Company") intends to modify instrumentation and/or antenna configurations at certain wireless telecommunications facilities. As required by the Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review the Company's proposal. Please accept this letter and attachments as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

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Sincerely,

David S. Malko, P.E.
Consultant for New Cingular Wireless

Enclosure

FAX

TO:	David Martin	FAX #: 860-827-2950
FROM:	David Malko	FAX #: 802-875-4515 PHONE#: 802-875-4514
DATE:	2/21/06	
SUBJ:	Power Density Detail For 2/14/06 filing	Number of Pages: 2 (inc. cover page)

Attached is the power density detail supporting my 2/14 exempt mod filing.

Call with any questions,
Dave

RECEIVED
FEB 21 2006
CONNECTICUT
SITING COUNCIL

Cingular SiteID	Site	Carrier	#Channels	ERP/Ch	Ant Ht	Density (m\	MHz	S	%MPE	Cing Total
2130	Greenwich - Riversville Road	SNET/Cingular	6	100	150	0.0096	850	0.5667	1.69%	
2130		CINGULAR GSM	3	296	156	0.0131	880	0.5867	2.24%	
2130		CINGULAR GSM	1	427	156	0.0063	1930	1.0000	0.63%	4.56%
2142	Wilton - 128 Old Mather Road	Cingular/TDMA	9	100	152	0.0140	880	0.5867	2.39%	
2142	Wilton - 128 Old Mather Road	Cingular/GSM	2	296	156	0.0087	880	0.5867	1.49%	
2142	Wilton - 128 Old Mather Road	Cingular/GSM	1	427	156	0.0063	1930	1.0000	0.63%	4.51%
2147	Westport - 880 Post Road East	SNET	10	40	150	0.0064	825	0.5500	1.16%	
2147	Westport - 880 Post Road East	CINGULAR GSM	2	296	133	0.0120	880	0.5867	2.05%	
2147	Westport - 880 Post Road East	CINGULAR GSM	1	427	133	0.0087	1930	1.0000	0.87%	4.08%